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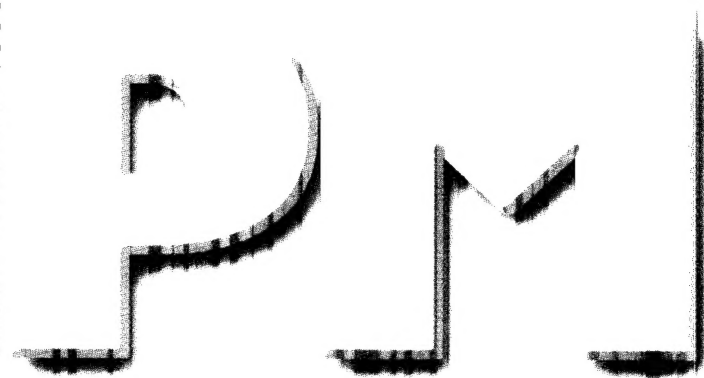
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Navy Capt. Drew Beasley Leads Team Effort to Deliver Joint Simulation System (JSIMS)



"JSIMS will provide the military and its commanders — from the Pentagon to the Pacific, from Rhein-Main to Riyadh — the advantages of realistic, interactive, more cost-effective [simulation warfare] training than previously ever possible."

PROGRAM MANAGER

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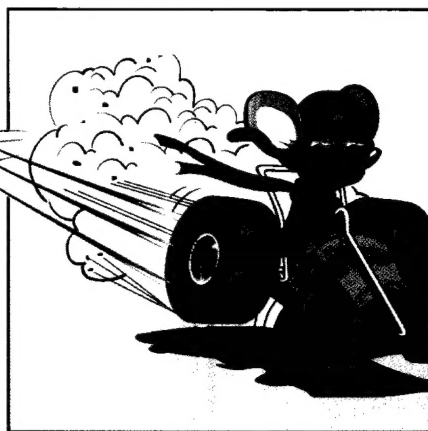


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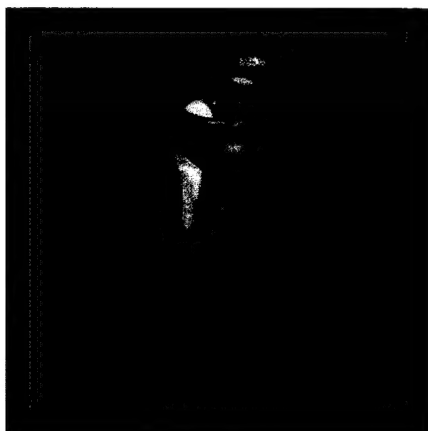


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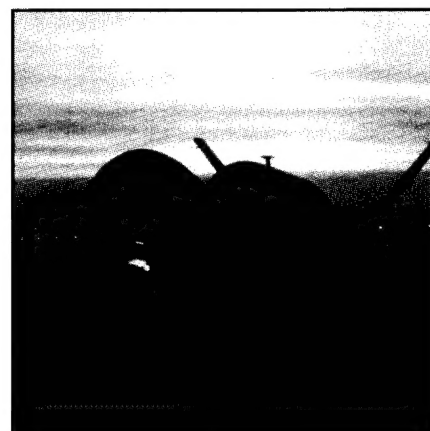


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Building a *Simulation* World to Match The *Real* World

Navy Capt. Drew Beasley Leads Team Effort to Deliver JSIMS — Nation's Most Advanced Simulated Warfare System

KARI PUGH • COLLIE JOHNSON



"In today's post-Cold War era, global politics are more complex, fluid, and unpredictable than ever. All branches of our military must now be prepared to work together to confront any of several potential foes under widely varying conditions. In such an environment, the ability to exercise both Joint and combined task forces command and staff personnel, under realistic simulated battle conditions, is crucial."

"I urge you to consider the advantages of the Joint Simulation System. It is the one modeling and simulation tool which will prepare all our commanders to coordinate their forces for all levels of warfare, wherever we might have to conduct it."

—Retired Army Gen. John M. Shalikashvili
Former Chairman, Joint Chiefs of Staff

Today's warfighter lives and fights in a complex world. Unprecedented technological advances in modeling and simulation are providing greater opportunities than ever before to conduct more effective and realistic training and improve readiness at lower costs. Everywhere you look, DoD's austere budget situation forces the Military Services to "look for the value added" and aggressively seek out affordable, "results-oriented" approaches to training and readiness.

This story is about a new approach to simulated warfare that will, in essence, build a *simulation* world to match the *real* world. Although this article will un-

doubtedly draw its largest audience from the modeling and simulation (M&S) community, it's also a story for commanders and warfighters, about an increased fighting edge made possible through the unprecedented technological breakthroughs of recent years.

Leading the Way

In 1995 the Navy selected Capt. Drew Beasley to head the Joint Simulation System (JSIMS) Program Office — undeniably one of the biggest challenges of his career. An experienced program manager and deputy program manager, Beasley had served in several diversified positions that added to his credentials for the job: engineering officer; opera-



The Joint Simulation System

Pugh is a staff reporter for the Free Lance-Star, Fredericksburg, Va. Johnson is managing editor, Program Manager, Visual Arts and Press Department, Division of College Administration and Services, DSMC.

tions officer; company officer; destroyer commander; technical director; and most recently, former program manager for the Battle Force Tactical Training System, Naval Sea Systems Command.

"I was appointed by the Assistant Secretary of the Navy for Research, Development and Acquisition, to take this job," Beasley says of his selection. "And I believe that the decision was probably based on the skills required for the job. Since I was assigned to the Naval Sea Systems Command Battle Force Tactical Training System [BFTTS], I was already working closely with the modeling and simulation community. At that time, BFTTS was going to be the keynote of the Navy's contributions to JSIMS."

When Beasley turned over management of the JSIMS Program Office to his successor, Army Col. James R. Taylor, he left JSIMS and Taylor with a strong, viable program. But his most important legacy by far was generating unprecedented levels of support and collaboration among the Services and Agencies on a Joint program — not an easy accomplishment for any program manager.

How he and his team — the JSIMS Joint Program Office — pulled together a plan, formed an "enterprise" conglomerate, and built a strong foundation for the nation's most advanced simulated warfare system is a story that offers renewed inspiration for engineers, programmers, and program managers who, like Beasley, face the inherent difficulties and monumental challenges of managing Joint programs.

The Need for a Joint System

The Department of Defense (DoD) now has an array of sophisticated visual systems for simulated warfare training that represent incredible advances in M&S technologies. In the past 20 years, every branch of the Armed Forces has adopted simulated warfare training created by advances in sophisticated visual systems. But as might be expected, the systems now used by the various branches reflect each branch's perspective of warfare and only meet needs for single-Service training.

"Realistic and stressful training has been the primary way to keep readiness high and prepare us to face the challenges of combat."

—Joint Vision 2010

Consider this: The Army has CBS (the Corps Battle Simulation System), the Marines have MTWSS (Marine Air Ground Task Force [MAGTF] Tactical Warfare Simulation System), the Navy has RESA (Research Evaluation and Systems Analysis), and the Air Force has AWSIMS (Air Warfare Simulation). The Army also has TACSIM (Tactical Simulation) as well as CSSTSS (Combat Service Support Training Simulation System). Then there's JECEWSI (Joint Electronic Combat Electronic Warfare Simulation). And finally, we have the U.S. Space Command's PSM (Portable Space Model).

All of these simulations are part of what's called the Joint Training Confederation or JTC. JSIMS, as designed, will ultimately replace the JTC.

Interoperability Crucial

Obviously, real warfare is not conducted by the Services in isolation, but in joint and coordinated efforts with one another,

and often with allied forces. Therein lies the problem with all this incredible technology.

Most current training simulation systems are Service-specific. They are not interoperable. In other words, they don't "talk" to one another in a manner that supports a fully integrated representation of the battlespace. JSIMS will eliminate the many, often redundant current models and simulations that have reached their technological limit and do not provide true interoperability.

Besides providing 21st century warfighters a simulated training environment using real-world Command, Control, Communications, Computers, and Intelligence (C4I) systems, JSIMS will also mate with real "go-to-war" C4I systems. No longer will warfighters be dependent on inefficient work-arounds to achieve interoperability.

Over the years, attempts to link the several simulation systems for Joint exercises have proven largely ineffective, due to differing architecture and conflicting databases. Commanders, who are required to act in concert with their counterparts at other command centers and in other Services, have found this particularly frustrating. DoD recognized that a single integrated system for all Services had to be developed so that, put simply, warfighters could *train the way they fight*.

Beasley speaks of ensuring interoperability as the "largest challenge of the program. It's not necessarily the technical but the management challenges that have been the most difficult ... the efforts to manage different programs from different Services and Agencies and their contractors." He notes that in many cases verbiage that directs interoperability with the Joint Simulation System has been inserted in contract wording.

First a Vision

To begin, Beasley and his team developed a two-part vision, identifying how JSIMS will be used and how it will be developed. The first part, the JSIMS Warfighter Vision, is a short, clear, concise statement that establishes JSIMS as

CAPT. DREW W. BEASLEY, U.S. NAVY

JSIMS Program Manager August 1995 — August 1998

Captain Drew W. Beasley was born in Baltimore, Md., Aug. 28, 1947. He enlisted in the U.S. Naval Reserve in September 1964, completing Basic Training at the Naval Training Center, Great Lakes, Ill. He went on to graduate from the U.S. Naval Academy and received his commission in June 1971.



From September 1971 until August 1995, Beasley held several positions of increased responsibility: Gunnery Assistant aboard the *USS Claude V. Ricketts* (DDG-5), homeported in Norfolk, Va.; Engineer Officer aboard the *USS Roark* (FF 1053), San Diego, Calif.; Operations Officer aboard the *USS Frederick* (LST 1184); Company Officer and Commandant's Administrative Assistant, U.S. Naval Academy; and Combat System Officer aboard the *USS BELKNAP* (CG-26).

Other assignments included: Commanding Officer, *USS Pegaus* (PHM-1); Long Range Missile Weapon Systems Division (TERRIER) Technical Director/Deputy Program Manager, Naval Sea Systems Command (NAVSEA); and Commanding Officer of the Destroyer, *USS Stump* (DD 978). Following that assignment, he attended the National Defense University, Industrial College of the Armed Forces.

In the Joint arena, Beasley served as Acting Director of Pacific Armaments Cooperation (Asia & Southern Hemisphere) Division, Dual Use Technology Policy & International Programs, Office of the Under Secretary of Defense (Acquisition & Technology). Returning to NAVSEA, he was the Director, Combat Systems Training and Support Division, and Program Manager for the Battle Force Tactical Training System.

Beasley's military awards and decorations include the Defense Superior Service Medal, Meritorious Service Medal with two gold stars in lieu of third award, Navy Commendation Medal with gold star in lieu of second award, Navy Achievement Medal, National Defense Service Medal, Sea Service Deployment Ribbon with four stars, and Battle Efficiency and Excellence Award. Additionally, Beasley received a special commendation from the Government of Australia and Australian Defence Force for his work in international programs.

Beasley's academic achievements include a Bachelor of Science degree in Oceanography from the U.S. Naval Academy (1971); graduate of the National Defense University, Industrial College of the Armed Forces (1992); and a Master of Public Administration degree from The George Washington University (1992). He is an inducted member of Pi Alpha Alpha, the National Honor Society for Public Administrators (1993), and a graduate of the Executive Program Managers Course, Defense Systems Management College.

Beasley is married to the former Bonnie Ann Huber of Baltimore, Md. They have five children and recently moved from Orlando, Fla., to Potomac Falls, Va.

a simulation system that will support the 21st century warfighter's preparation for real-world contingencies. By interfacing to real go-to-war systems, JSIMS will provide warfighters a view into the simulation world that mirrors that of the real world.

The second part captures the JSIMS Technical Vision: a single, distributed, seamlessly integrated simulation environment.

Once the team came up with a credible vision, they turned their attention to the mission. "We see our mission as twofold," says Air Force Lt. Col. Gaylord "Gus" Liby, the JSIMS User Advocacy Director. "One is to deliver the core software that everybody is going to use and reconfigure for their specific needs; and the other part is the overall development of the entire enterprise effort."

To ensure JSIMS is being developed as a single system, Beasley and his team proposed an "enterprise effort" — a collaborative development effort that focuses on building one system to satisfy all requirements. "The word 'enterprise' is so critical in this," says Beasley. "We engage everyone at the same time in an IPT [Integrated Product Team] process; all the partners are engaged and empowered, and are working the same issues, trying to come up with a common solution."

To advance this enterprise effort the JSIMS team, in effect, established a "conglomerate" called the "JSIMS Enterprise." Comprised of National, Joint, and DoD organizations, executive agents, and development agents, the JSIMS Enterprise, in reality, is a large conglomerate of government and industry partners across a wide range of interests.

Although the word "enterprise" is not a term normally associated with the government or military, the JSIMS Enterprise most certainly meets the primary definition of "enterprise": *a project undertaken that is important or difficult, or that requires boldness or energy*. In addition to TRW, which is the JSIMS prime contractor as well as several subcontractors, the JSIMS Enterprise suffers no

lack of bold energetic partners from all walks of DoD:

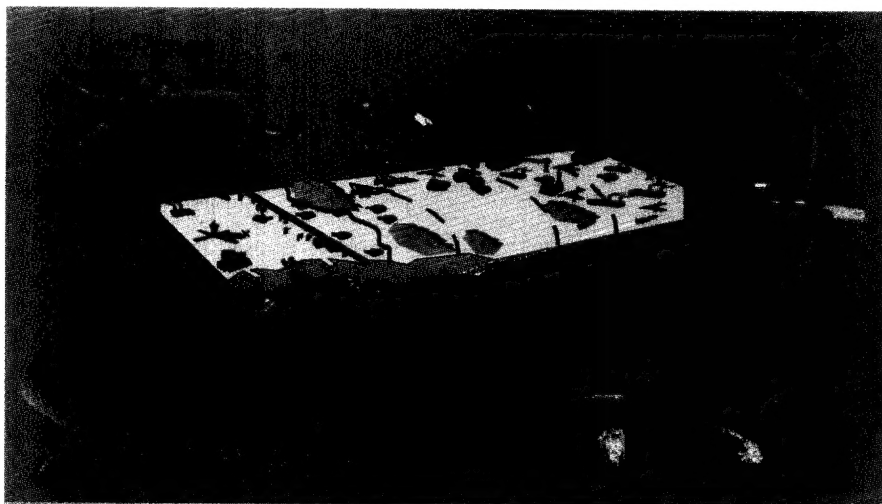
Joint. In the Joint arena, enterprise partners include the Joint Staff, the Joint Program Office, and the U.S. Atlantic Command Joint Warfighting Center.

Army. On the Army side, partners include the Deputy Chief of Staff for Operations (DCSOPS), Simulation Training and Instrumentation Command (STRICOM), and Operational Test and Evaluation Command (OPTEC).

Air Force. Air Force partners include the Program Executive Officer for Airlift, Trainers, Modeling and Simulation; Air Staff Command and Control; Electronic Systems Center; Air Force Combat Climatology Command; and Air Force Operational Test and Evaluation.

Navy. On the Navy side, enterprise partners include the Chief of Naval Training, N7; the Naval Sea Systems Command, PMS430; Space and Naval Warfare Systems Command (SPAWAR), PMW131; Oceanographer of the Navy (N096); Operational Test and Evaluation Force; and Naval Doctrine Command.

Marine Corps. The Marines also participate in the JSIMS Enterprise, represented by the Marine Corps Combat Development Command, the Marine Corps Systems Command, and the Marine Corps Test and Evaluation Activity.



Supporting the Way We Fight

As with all successful programs, Beasley and his team have a plan. They call it the Enterprise Management Plan — a comprehensive set of overarching management guidelines and strategies that establish the structures, processes, and concept of operations for the JSIMS Enterprise.

DoD. Finally, the enterprise partnership includes members from key research, intelligence, and information organizations across DoD: Defense Intelligence Agency, Defense Information Systems Agency, Defense Modeling and Simulation Office, Defense Advanced Research Projects Agency, National Reconnaissance Office, National Security Agency, and National Imagery and Mapping Agency.

To illustrate the role of the JSIMS Enterprise, Liby uses the Vikings as an analogy. "If you take a look at the Vikings, free men who sailed the world voluntarily, they sacrificed self-interest for the good of all. They wanted to be involved and reap the benefits of contributing to a new world."

In the same way, Liby points out, the players in the JSIMS Enterprise are realizing the benefits of being contributors in the JSIMS effort, not bystanders as is usually the case in traditional Joint programs where the players don't really have a choice.

Beasley has this to say about the critical role of the JSIMS Enterprise. "It removes some of the Service parochialism and puts it into more of a domain aspect. That is where we can see some of the consolidation. We're seeing some of the melding of cultures among Services."

As with all successful programs, Beasley and his team have a plan. They call it the Enterprise Management Plan — a comprehensive set of overarching management guidelines and strategies that establish the structures, processes, and concept of operations for the JSIMS Enterprise.

The architecture they envision will be filled with Core and Common Services, Utilities, and Mission-Space Objects. Key to that architecture will be a common simulation engine, including the system software JSIMS needs to run on commercially available, open architecture computer hardware and networks.

To allow an ongoing simulated exercise to be viewed and monitored among local

computer stations as well as geographically dispersed computer sites across states or countries, JSIMS exercises will be fully distributed using the High Level Architecture (HLA), which is part of the common simulation engine.

True Interoperability

JSIMS will also support Unified Combatant Commands, Services, and Joint Task Force training in all phases of military operations (i.e., mobilization, deployment, employment sustainment, redeployment, and operations other than war).

These elements could be composed to create a simulation capability in order to support Joint or Service training, rehearsal, or educational objectives.

For JSIMS to work, Beasley explains that each Service must contribute their core areas of expertise. The Army, if left to their own devices with no outside program, for example, would have to build a simulation to meet 21st century warfighter needs. Obviously such a system would have to include a fairly robust representation of air power, such as A-10s or "tank killers" as well as high-cover F-15/F-16 or, eventually, F-22 capabilities.

He goes on to explain that if the Army had no other outside resources to depend upon, they would have to build all of the air-power representation themselves. Not only would they have to build the air power, but also some modicum of naval shore-fire support and some modicum of intelligence support to play into how they actually do business.

Says Beasley, "The win-win of JSIMS comes in at this point, where they [Army] don't have to build the air power, the mission-space objects, the A-10s, the F-15s, the F-16s, and the F-22s. They don't have to build the overhead resources or intelligence resources. They don't have to build the ship representation for shore-fire support. They don't have to build all these other externalities. Those elements are not in their domain. They are not in their core competencies.

"What you see here are the different pieces coming together," he continues. "The Army concentrates on their domain and their core competencies; each of the individual Service and Agency partners do the same."

The JSIMS Program Office puts it this way. "In the real world, airmen will give

you a great battle plan and tell you how to win the war with air power. But then a soldier gets involved and says, 'Well, that's great, but let me talk to you about a little bit of the realities.' And in the end you have a plan that is stronger than any one of the individual inputs would have been. And that," they conclude, "is the best method — the method that we've chosen to use."

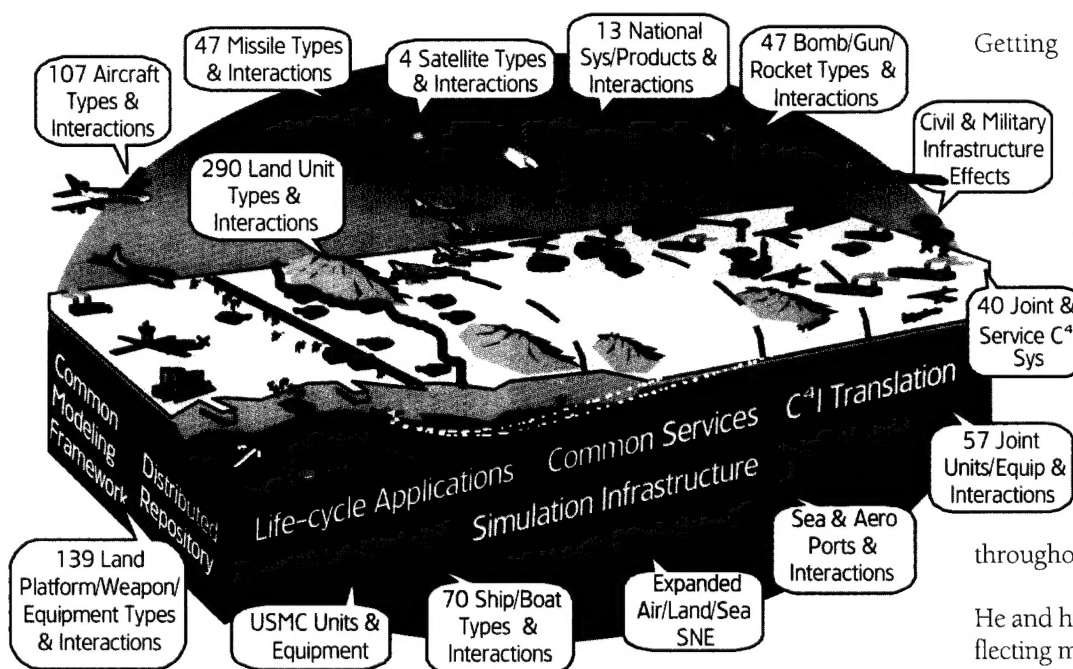
Ultimately, JSIMS, as the core architecture, will represent the richest repository of simulated warfare data and intelligence for every subscriber, according to Beasley, because it will bring in the best parts from each Service or Agency. "But each part must subscribe to the core architecture," he cautions, "because otherwise it doesn't mean anything."

JSIMS — A Joint Program

Beasley talks about the difficulties of managing Joint programs, an inherently difficult challenge for any program manager. "When you go into a Joint arena, the Services still tend to look at management with a jaundiced eye, perhaps because of a perception that you're working outside of your realm. You can't possibly anticipate my Service's needs because you're outside my Service culture." So from that aspect alone, I approached the job with some trepidation."

Getting the right help, Beasley acknowledges, was akin to an "entrepreneurial startup program." But eventually he pulled together a staff to run the Joint Program Office: 15 officers, representing all the Armed Forces; a civilian staff; and a contract support staff. "When I came on board, none of that was in place. So it's been a challenge — but fun — something I've enjoyed immensely and had the opportunity to do on a couple of other occasions throughout my career."

He and his team have big objectives, reflecting marked improvement from previous methods of conducting Joint warfare training.



JSIMS Enterprise—Balanced, Joint Synthetic Battlespace

"And that's a key point," says Beasley, "that makes us different from any other Joint programs. Typically, in the past, Joint programs have been, quote, 'given the authority' or at least the budget to go execute the mission. As a result of that, sometimes they move out without bringing all the Services along with them. What we're talking about here," he emphasizes, "is *buy-in*."

Beasley explains that if the JSIMS team held all the funds and managed all the development programs, the Services would have no other recourse than to look to the program office for representation. "Although attempted by other program offices in the past, this way of doing business really hasn't worked very well because those with the funds and authority haven't fully exercised what the Services needed, what they wanted, or what they thought they needed."

He attributes this lack of buy-in to cultural biases and an end product that was not satisfactory either as a Joint tool or as an individual Service representation tool.

Under JSIMS, Beasley emphasizes, each of the Services and Agencies retain their own funding to ensure that their needs are met with regard to their requirements, and also to develop those elements into the Joint Service needs that are accurate representations of their individual Service (core) areas of expertise.

Commonality, Compatibility Key

JSIMS will provide users in every Service common software. This commonality will allow JSIMS to be run on commercially available equipment in an open architecture format. Toward that end, Beasley and his team are building JSIMS using the latest technologies and designing it to allow technological breakthroughs in the future to be smoothly integrated into the current system.

It will use compatible hardware, support personnel, and procedures to produce a simulation exercise. Exercise planners, he explains, will build their own scenarios by selecting elements from the JSIMS Modeling and Simulation Resource Repository (JMSRR). These

"In the real world, airmen will give you a great battle plan and tell you how to win the war with air power. But then a soldier gets involved and says, 'Well, that's great, but let me talk to you about a little bit of the realities.' And in the end you have a plan that is stronger than any one of the individual inputs would have been."

elements — Space, Air, Land or Sea — form the Joint Simulation Training Environment, and allow rapid scenario generation to support quick-reaction mission rehearsals.

"The warfighting domain is built on a common foundation," says Beasley. "So when the Army pulls up a simulation, they're using the same foundation as the Air Force and the Navy. That hasn't occurred in the past. As the DoD, we've been paying for people to rebuild the wheel, if you will. That will stop."

JSIMS is a new simulation training tool designed for a new era in the global military mission. Including planning and rehearsal capabilities, it offers total interoperability of Joint training simulation, combining C4I, logistics, and doctrine into a worldwide team event.

JSIMS and its family of programs will replace the current Joint Training Confederation at Initial Operational Capability (IOC) in 2001, and will continue to improve capabilities through Final Operational Capability (FOC) in 2003.

TRW — Prime Contractor

On Dec. 2, 1996, the TRW team was selected as the prime integration and development contractor for JSIMS. The



The Joint Simulation Training Environment

project will prove a management challenge, with TRW juggling layers of other defense contractors and high-level government officials. Although TRW is the prime developer of the JSIMS Core and responsible for integration of product contributions, the JSIMS system is being developed by multiple prime contractors, all representing the various warfare domains (e.g., Land, Air and Space, Maritime, and Intelligence).

Beasley acknowledges that his team has, in many respects, burdened TRW with an enormous amount of responsibility for interfacing all the parts coming in. In essence, he explains that TRW has two responsibilities. The first is to deliver the common foundation, or the core software. The second is to integrate the efforts (and the products) of six different contractors and subcontractors so that the whole thing works when it's all put together.

Beasley emphasizes that the outside world has been very dominant in shaping how TRW organizes, how they interface, and how they do business. "In every instance," he says, "they [TRW] have stood up to the challenge, but it's been an especially hard road for them to travel.

"This has been a tremendous management challenge for TRW," he continues, "that probably rivals the space shuttle and NASA-type development. But at NASA, they typically have a single product manager and single-source funding, which we do not. Because of that, this is a very unique challenge for industry to be able to deal with the Services and Agencies in the manner in which we are ... It's really a new challenge for industry and something that they haven't seen before, nor have we. We're learning together as we move forward within the context of the JSIMS Enterprise."

As the project comes together, the JSIMS team must also deal with leaders from across all Services, as well as the Intelligence community and defense-industry partners. An OSD review team oversees the program, but each player in the JSIMS program also has someone to answer to

along traditional acquisition lines of authority.

"It's really a collaboration of all the member Services and the Intelligence community," says Air Force Maj. Dennis Verpoorten of the JSIMS Program Office in Orlando, Fla. "It's not like your regular program office. We're all trying to work together and ensure that the Warfighting Center will be compliant with all the Services. Everyone has to be able to see what's on the battlefield."

Challenges, Benefits

For the defense acquisition community, this collaborative effort marks a whole different way of doing business.

"People are used to certain contracts progressing in a certain way, in that you do not let a contract until you have a very detailed A-spec in place," Beasley said. "Under Acquisition Reform, the contractor helps develop that with you."

Program management and trying to run a conglomerate, Beasley says, are continuous challenges. "Managing JSIMS has been an interesting study in dynamics, in Service cultures, and bringing together efforts that link more on a moral plane than they do on a resource plane."

The benefits of JSIMS, once fully operable, are worth the tremendous effort Beasley and his team are putting into making DoD's warfare simulation training truly Joint. Twenty-first century commanders can look forward to some big advantages that give them that extra edge on the battlefield.

JSIMS is uniquely designed for simultaneous global use. Commanders around the world, on land or at sea, will participate in the same exercise at the same time, as can their geographically dispersed local forces. In today's environment of limited and ever-shrinking resources, this capability substantially lowers travel costs and makes more training events economically feasible.

Further, JSIMS will also provide unprecedented interoperability among

global users. This fully supports Joint Vision 2010's need for simulations that are interconnected globally, creating a near real-time interactive simulation super-highway between forces in every theater.

The result: Future battle simulations will be perceived consistently by all participants and provide valid interactions among commanders. All participating forces will train in a common synergistic environment of terrain, oceans, atmosphere, and space; and they'll interact directly in seamless integration with other forces in a realistic environment.

JSIMS will be richly detailed in its representations. It will simulate all forces — friendly, enemy, and neutral military and civilian. It can provide training in every variable of combat environment — terrain and buildings, climate and weather, smoke, day and night. And it enables modelers to develop new battlefield conditions and updated contingencies for wargames with future capabilities.

JSIMS will make simulation, especially at command levels, more adaptable immediately and more accommodating into the foreseeable future as the global political picture, military weapons and organizations, and operational procedures evolve.

Finally, JSIMS will give commanders a few added benefits that will, most certainly, add up to a few dollars saved:

- Interface through real-world, go-to-war C4I systems.
- Sharing of Service and staff capabilities.
- Greater inter-Service compatibilities.
- Reduced Operations and Maintenance (O&M) costs.
- Two-thirds reduction in simulation support personnel.

All of these advantages will significantly enhance realism and improve training effectiveness.

All In the Family

When Beasley retired late last year, not only did he leave behind the JSIMS team,

he left behind his "family." But he took away, however, some valuable lessons in cooperation. Beasley likens his role within the JSIMS Joint Program Office to an authority figure in a large family. It was his job to keep the peace and keep things moving.

"Within a conglomerate, within a family, you have to have trust," Beasley said. "I might have the authority, but if you don't do this in a collaborative effort and if you do it autocratically, you lose the trust of your different family partners.

"Now this is a family. And like most families, we scrap a lot. But we're still trying to maintain that factor of trust, or to rebuild it, because there is always ebbing

and flowing of those different factors that make up an enterprise."

Looking Ahead

JSIMS is not yet fully designed and built. Phase I—outlining the processes and procedures of the \$0.7 billion venture—was recently completed. But within two years, parts of the system will be up and running.

Beasley points out that JSIMS is a big part of building and implementing the capabilities outlined in Secretary of Defense William S. Cohen's Joint Vision 2010. Ultimately, he says, it will provide the military and its commanders—from the Pentagon to the Pacific, from Rhein-Main to Riyadh—the advantages of realistic, interactive, more

cost-effective training than previously ever possible.

Editor's Note: In compliance with the JSIMS Memorandum of Agreement, the program is rotated among the Services, with the Air Force fulfilling the role of permanent acquisition lead.

On Aug. 26, 1998, Army Col. James R. Taylor became the JSIMS Program Manager. After a short transition period, Navy Capt. Drew Beasley retired from active duty on Nov. 1, 1998. Currently, he is employed by SIR, Inc., in Arlington, Va.

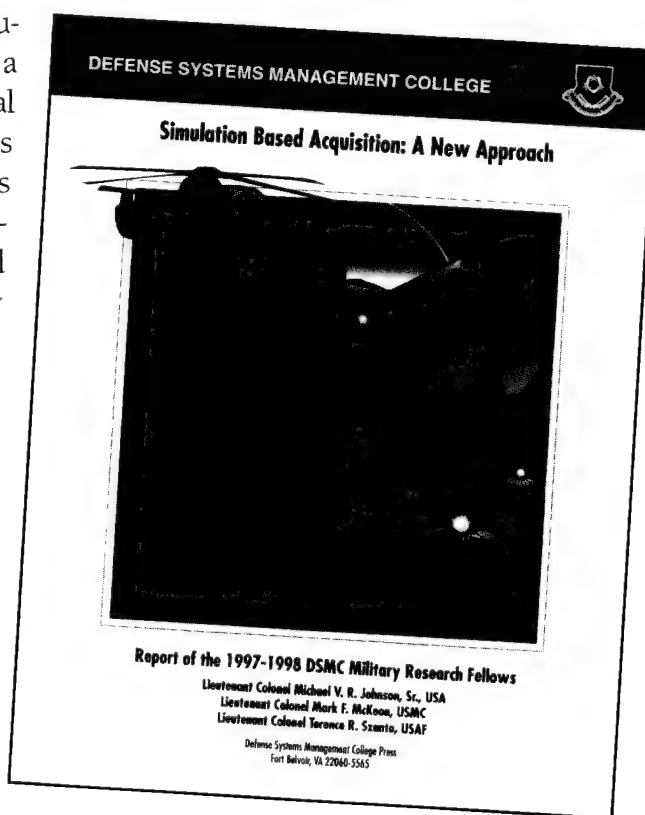
For more information on JSIMS, contact Army Maj. Dennis Verpoorten at (407) 384-5516 or visit the JSIMS Web site at <http://www.jsims.com> on the Internet.

WHAT'S NEW?

1997-1998 DSMC Research Fellows Report *Simulation Based Acquisition — A New Approach*

Convincing program managers that Simulation Based Acquisition (SBA) is a smarter way of doing business is the goal of the 1997-1998 DSMC Research Fellows Report. The report defines SBA, explains its strengths, and describes forces that encourage its use. It also includes best practices and guidance for implementing SBA—a new way of doing business that couples rapid advances in simulation technology with process change.

Fully digitized Military Research Fellows Reports, 1994 through 1998, are available on the DSMC Web site at <http://www.dsmc.dsm.mil/pubs/mfrpts/mrflist.htm> on the Internet. Hard copies may be requested by faxing the DSMC Distribution Center: Commercial (703) 805-3726; DSN 655-3726.



Under Secretary of Defense (Acquisition and Technology) Sets New Standards for the Defense Acquisition Workforce

Jacques S. Gansler, Under Secretary of Defense (Acquisition and Technology) (USD[A&T]), has issued a broad new policy requiring all defense acquisition personnel to engage in the equivalent of 80 hours of continuous-learning activity every two years. The policy applies to approximately 100,000 civilian and military members of the defense acquisition workforce, ranging from scientific and technical personnel to contracting specialists.

Since 1991, when the Defense Acquisition Workforce Improvement Act (DAWIA) was passed by Congress, the DoD acquisition workforce has enjoyed one of the most comprehensive career development programs in the federal government. Designed to ensure that acquisition personnel have the knowledge and skills necessary to perform effectively in multiple defense acquisition specialties, the DAWIA directed the department to take certain actions to promote professionalism of its acquisition workforce.

In implementing DAWIA, DoD established a process called the "Certification Program" through which acquisition personnel are recognized as having achieved professional status by meeting the professional standards of education, training and experience established for a career level I, II, or III in any of the 11 acquisition career fields.

The 11 career fields are: program management; communications-computer systems; contracting, including construction; purchasing; industrial/contract property management; systems planning, research, development and engineering; test and evaluation; manufacturing,

production and quality assurance; acquisition logistics; business, cost estimating and financial management; and auditing.

The certification standards include successful completion of mandatory training courses addressing the competencies required to perform acquisition functions in these career fields at each of the three levels. Although the mandatory acquisition training courses are updated on a regular basis, DoD acquisition policy officials became concerned that the rapid pace of change and reengineering was outstripping employees' ability to stay abreast of acquisition reforms and new business practices. Of particular concern were acquisition specialists who had completed mandatory certification training in prior years, but had not attended additional training in the interim.

The USD (A&T) subsequently directed the development of a comprehensive continuous learning policy to help acquisition personnel to stay current, and to meet performance expectations in a rapidly evolving work environment. Titled "Reform Through Learning: USD (A&T) Policy on Continuous Learning for the Defense Acquisition Workforce," the resulting document was developed with the participation of some 50 DoD components, including the military services and defense agencies, and is among the most far-reaching and comprehensive frameworks for employee development and lifelong learning in the federal sector.

Although focused principally on those employees who have completed certification requirements for the positions they hold, the policy applies to all members of the acquisition work-

force. All personnel are required to annually assess their needs for training and development, and prepare an individual development plan in consultation with their supervisors. Acquisition personnel who have not yet been certified for the positions they hold are required to focus their development plan on completing the mandatory education and training requirements, and on participation in on-the-job learning activities to practice and broaden their skills.

Acquisition personnel who have achieved certification for the positions they hold are required to engage in "continuous learning" activities, earning a minimum of 80 points every two years. Designed to respond to the USD (A&T)'s call for "more systems thinkers and good managers," the policy provides a systematic approach to employee development by augmenting the existing standards for education, training and experience, and adding new dimensions in leadership skills and participation in professional activities.

Hence, employees may stay current and earn their 80 points in a variety of ways by engaging in formal and informal learning, and experiential and professional activities, including:

- Participating in training and conferences focusing on Acquisition Reform subjects and emerging acquisition policies and practices.
- Taking cross-training in other acquisition specialties or higher levels of certification training in their own career fields to broaden and expand their competencies.
- Engaging in training, addressing one or more of the leadership competencies identified in the OPM Leadership Effectiveness Inventory.
- Enrolling in undergraduate and graduate level courses in the scientific, technical or business disciplines underpinning acquisition fields.
- Engaging in experiential learning, and rotational and developmental assignments to practice new skills or gain multi-functional experience.
- Participating in professional activities such as teaching, speaking, publishing or pursuing professional certifications or licenses.
- Maintaining active membership in professional organizations related to acquisition fields.

Developmental guides have been designed for each career field to serve as a roadmap for employees to follow in tailoring and individualizing their activities. Personnel can use these guides to plan learning activities that are both congruent with the education, training and experience enhancements recommended at appropriate stages of career progression, as well as supportive of their own career goals.

Finally, policy guidelines for awarding point credits help the employee and supervisor determine the value of activities undertaken and convert disparate crediting schemes, such as academic credit, continuing education units and other types of measures, into a common point system for crediting employee participation. When they earn a minimum of 80 points, acquisition personnel will receive a Continuous Learning Certification, valid for two years, which is to be renewed on a biennial basis.

Editor's Note: This press release, published by the Office of the Under Secretary of Defense (Acquisition & Technology) in December 1998, is in the public domain. To read the full text of "Reform Through Learning: USD (A&T) Policy on Continuous Learning for the Defense Acquisition Workforce," visit ACQWEB, the USD(A&T) Web site, at <http://www.acq.osd.mil> on the Internet.

Simulation Based Acquisition

Can It Live Up to Its Promises?

CMDR. DAVID P. BROWN, U.S. NAVY



One of the key areas of Acquisition Reform is the increased use of Modeling and Simulation (M&S) in all phases of life-cycle management of defense systems. Dr. Jacques S. Gansler, Under Secretary of Defense (Acquisition & Technology), recently emphasized this policy in his memorandum endorsing a joint DoD-Industry initiative to define a roadmap for Simulation Based Acquisition (SBA).¹

The move toward SBA was driven primarily by a report commissioned by Dr. Patricia Sanders, Director, Test, Systems Engineering and Evaluation, on the effectiveness of M&S in the acquisition process.² A one-year study effort, the report was prepared by a team chartered to visit and obtain data from government and industry on the metrics of successful M&S implementation. Although both generally agreed that substantial benefits may be derived from using M&S in certain areas, very little data exist on the quantifiable benefits.

Although well intentioned, this study falls short of its intended purpose of quantifying the benefits of M&S. The shortcomings of the study can be summarized in one sentence from the summary of the final report: "Substantial evidence has been collected from individual success stories, though the benefits are not readily quantifiable into a general standard."³

Brown is a Professor of Systems Engineering at the Defense Systems Management College. He has 20 years of operational and acquisition experience, including assignment as Propulsion Systems IPT Leader for the Joint Advanced Strike Technology Program (now the Joint Strike Fighter). Brown is a graduate of APMC 97-3, DSMC.

The first problem is that the study team used data based on "success stories" to substantiate the conclusions. A scientific assessment should attempt to measure any impacts, positive and negative. Conclusions should then be drawn after evaluating all of the results. Obviously, if the team used only successes to investigate the impact of M&S, then a positive outcome was the only possible result.

The second problem is that the report fails to provide justifiable quantification of the benefits of M&S. This is because the study is composed almost entirely of "apples to oranges" comparisons between different programs. For example, one of the success stories cited in both the study and by Dr. Sanders in her article on M&S⁴ states the following: "The working drawings of the CH-53E Super Stallion aircraft's outside contours required 38 Sikorsky draftsmen approximately six months. The same task on the Comanche helicopter program required only one month's effort by one engineer using M&S."^{5,6}

This is an impressive figure, but what is the real contribution of M&S to the reduction in time and people? The Super Stallion is much larger physically, which would require more drawings. What is the contribution of Integrated Product Teams and other Acquisition Reform initiatives used in the Comanche program? What is the contribution of more powerful computers? Better M&S certainly played a role, but what was the real impact?

To truly quantify the benefits of using physics-based, integrated M&S, a rigorous study would be needed, comparing

different levels of M&S on the same program with all other variables held constant. This would be prohibitively expensive to conduct in the real world on a real program. However, the introduction of an advanced M&S tool as a pilot project into the systems engineering curriculum of the Advanced Program Management Course at the Defense Systems Management College (DSMC) recently provided just such an opportunity.

By providing a physics-based, integrated design and simulation tool to one section while providing the older model to another section for a control group, a comparison of the claims of advanced M&S can be tested. Since this experiment was not conducted on a real DoD acquisition program and the sample size is small, the magnitudes of any differences between the groups would not accurately quantify real development programs. However, it should show if SBA can live up to its claim of better, faster, and cheaper where a physics-based, integrated M&S tool is the only variable.

Project Background

The project used for our evaluation was the "mousetrap" exercise conducted as part of the systems engineering curriculum of DSMC's Advanced Program Management Course. To begin, we divided each section into five contractor teams and provided each team an Operational Requirements Document and a contract with a Statement of Work. Designed as an Advanced Concept Technology Demonstration (ACTD), the project parallels the Program Definition and Risk Reduction and early Engineering and Manufacturing phases of a full development program.



Guiding student contractor teams through the systems engineering process to an initial design, we then take them into manufacturing and test and evaluation of their prototype. The vehicles are built from a selection of parts provided by the government, with propulsion provided by the springs of one or two standard rat-traps. Once the teams reach prototype, the project concludes with a runoff of the prototypes, which must pass the following tests:

- The vehicle must be assembled by one person in less than 12 minutes using only common hand-tools and make a verification run traveling 25 feet in less than seven seconds while remaining within an eight-foot-wide lane (Figure 1).
- The vehicle must travel two round trips of 20 feet each trip delivering two poker chips (simulated ammunition rounds) while remaining within a six-foot-wide-lane in less than two minutes (Figure 2).
- The vehicle must tow a 1.25-pound sled at least five feet while remaining within a four-foot-wide lane (Figure 3).

Best value to the government is defined as the vehicle that can pass all the tests at the lowest unit cost and producibility index (product of the number of types of parts times the total number of parts).

The project used for our evaluation was the “mousetrap” exercise conducted as part of the systems engineering curriculum of DSMC’s Advanced Program Management Course.

In setting up the project, we were careful to ensure that the M&S tools were the only variable between the two sections chosen for the evaluation. Air Force Lt. Col. Frank Dibartolomeo and I taught the two sections. Since this was my first time teaching the APMC course, Frank taught the control group while I observed; reversing roles, I then taught the advanced M&S group while Frank watched.

Both groups received the same material and if either group had an advantage, it was the control group since they had a more experienced instructor. Another major difference between this project and the Sanders’ study was that we were looking for not only the benefits, but also the drawbacks of advanced M&S. One serious concern was that a standard M&S model might lead the contractor

teams to a single solution. Students might be tempted to build what the model told them was the best design without really understanding why. Such a situation might actually have a negative impact on the creativity of the students.

Control Group

The control group received the standard software model used in past APMC courses, which provided students information on one requirement of one test – the five-foot sled pull.

One calculation provides the distance over which the springs will provide power to the drive wheels based on the geometry of the design. This assumes that while towing the sled, the model will coast very little once it exhausts power from the springs.

A second equation provides the distance that a vehicle of a certain weight could travel if all the wind-up energy from the springs could be transformed into linear motion. A third equation provides how many springs the vehicle requires to start moving based on weight and drive train geometry.

Advanced Group

In preparation for the project, we provided the advanced M&S group an integrated design and simulation tool that I had developed specifically for the Stored Energy Ground Vehicle (SEGV) exercise, better known as “mousetrap.” Basically, my simulation is a physics-based representation of distance traveled over time using Newton’s Laws of Motion. As such, it can predict distances for any of the three tests, with or without the sled attached, when coupled to a spreadsheet containing the data on all the available parts provided in the parts kit.

By integrating the design model with the simulation, the advanced M&S group could vary their designs and see the impact on cost, weight, and producibility index. Students could then carry the weight, geometry, and other design parameters forward into the simulation where they could see the impacts on

FIGURE 1. Assembly Test

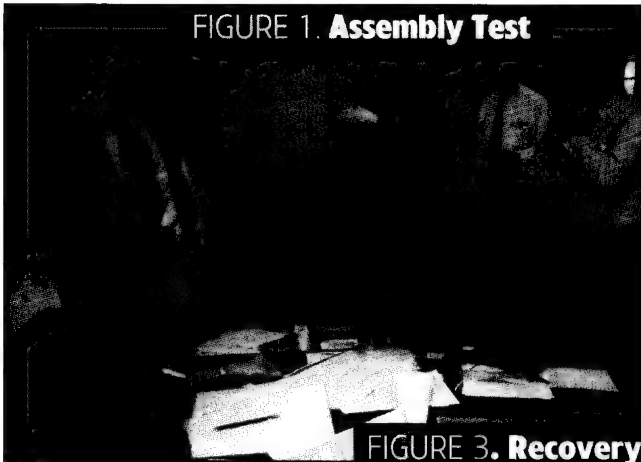


FIGURE 2. Resupply Test

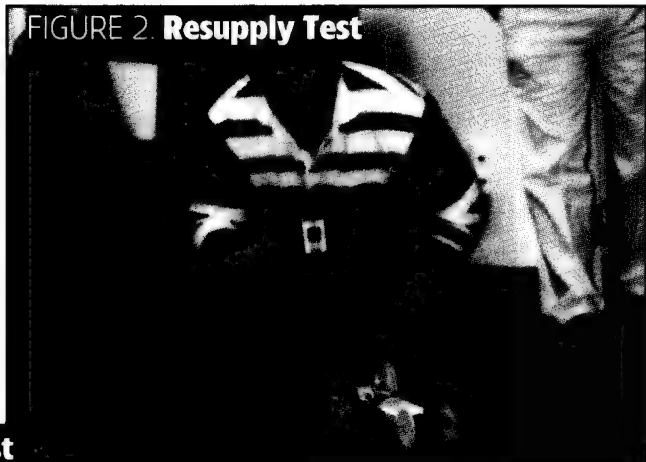


FIGURE 3. Recovery Test



distance performance for all modes of operation. The advanced M&S tool could not predict the directional accuracy of a design since this is primarily a function of manufacturing tolerances. It could also not predict the assembly time of the vehicle since this is a function of design and the person assembling the vehicle.

Based on the claims of SBA, one would expect the advanced M&S group to complete the project in less time while demonstrating a distinct advantage in distance performance, unit cost, and producibility index. There should be little difference in assembly time or directional accuracy since neither group had an advantage in these areas.

Project Results

Typically, we evaluate student progress at three major points during the project. In compiling data for this study, we used results comparing the five contractor teams from each section taken at the following three evaluation points:

Systems Functional Review

The first evaluation is during a Systems Functional Review (SFR). Students must correctly demonstrate and apply the Systems Engineering process in order to arrive at an initial paper design before we issue them a parts kit.

Preliminary Design Review

The second evaluation is a Preliminary Design Review (PDR) held at the conclusion of initial prototype testing. Students present the results of their contractor team testing along with a chronology of configuration changes made due to test results.

Final Evaluation

The final evaluation is a runoff held within one week of the PDR.

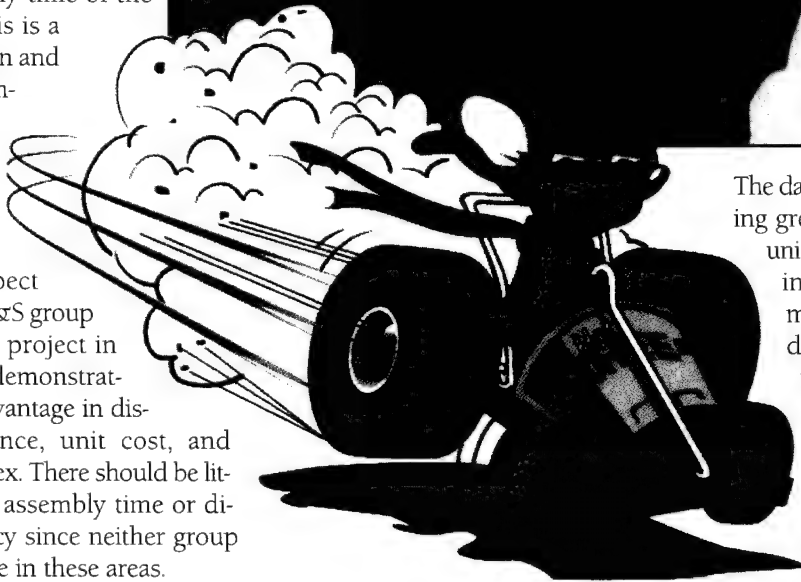
Initial cost and producibility data provided in Figure 4 show a strong advan-

tage at SFR to the advanced M&S group. Unit cost and producibility index were 20 percent and 56 percent lower respectively. This difference can be attributed to the advanced M&S group looking at three times the number of design concepts in software (Figure 5) to define the key system parameters using the physics-based, integrated M&S tool.

The data validate the SBA claim of achieving greater design maturity with lower unit cost and better producibility during the design phase of development. We perceived no notable difference in schedule between the two groups.

During the build and test phase of the exercise, the control group significantly narrowed the gap in terms of cost and producibility (Figure 4). What the advanced M&S group discovered during initial design work using the better M&S tool, the control group found using the more traditional build-test-fix method. The advanced M&S group still held an advantage in cost and producibility, and now also showed a performance advantage in sled tow range as the result of contractor testing (Figure 6).

One would expect a much higher number of engineering changes from the control group during this period as they caught up using the build-test-fix method. However, as shown in Figure 5,



this was not the case. In questioning the students on how they proceeded during the test phase, we found that the advanced M&S group continued to use M&S during the test phase. This group, due to their higher-fidelity designs, managed to get their prototypes working early in the test and evaluation phase of the program. However, the teams continued to use M&S and test results to improve their prototypes in the environment of competition.

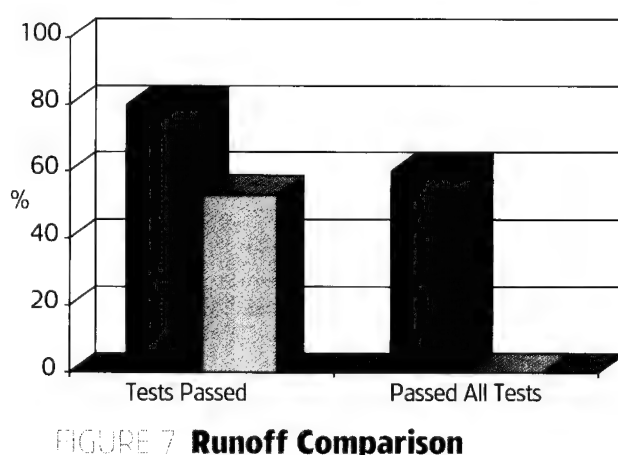
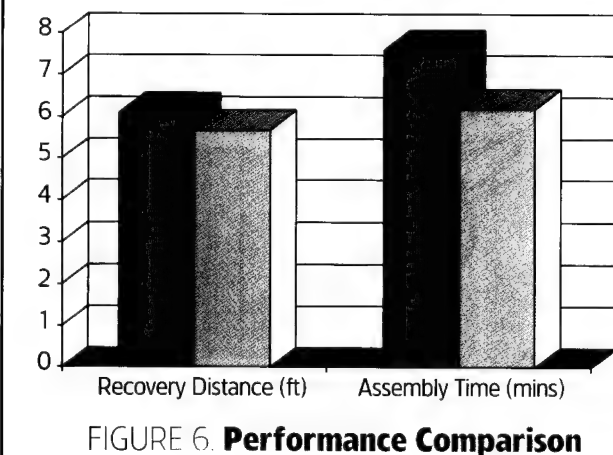
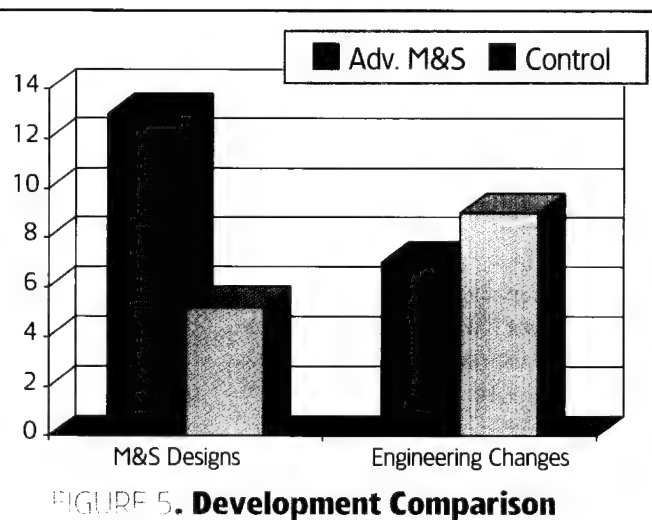
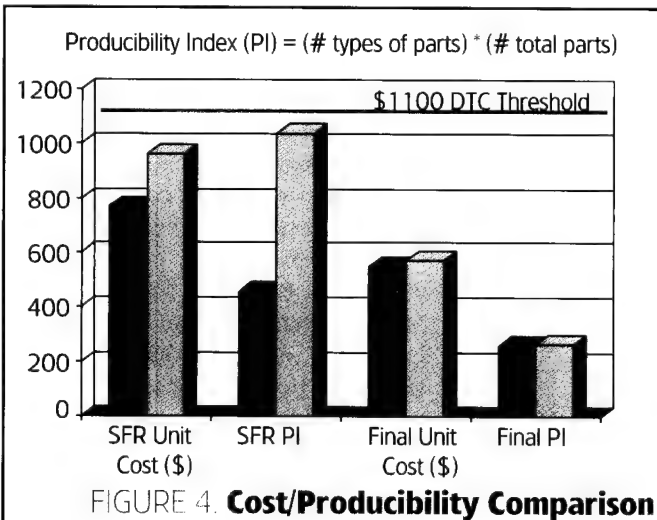
The introduction of advanced M&S in a competitive environment provided increased performance, lower unit cost, and better producibility. It did not provide any reduction in development cost or schedule for this particular phase. If the cost of the advanced M&S tool could be calculated and included, the development costs of the advanced M&S group might actually be higher.

During the runoff, we conducted the final evaluation of the prototypes (Figure 7). The results show that the advanced M&S group had a clear advantage in vehicle performance, with three of five designs meeting all performance requirements at well below the design-to-cost threshold of \$1100. As expected, the advanced M&S group gained no advantage in assembly time or directional accuracy. The control group had a lower average assembly time, while one concept from each group failed a test due to directional accuracy.

The advanced M&S group showed a strong performance advantage in the sled pull test, the most difficult of the distance requirements. During this test the advanced M&S group passed five of five concepts, while the control group passed only two of five.

The fear that advanced M&S might lead students to a common solution proved to be unfounded. As shown in Figure 8, a large variety of designs emerged among the advanced M&S group. Although no metric exists for measuring creativity, it appeared the advanced M&S group exhibited more initiative in their designs. This was probably due to the advanced M&S tool giving them a broader design space to explore in software.

The advanced group also appeared to have more time available for creative exploration in the test and evaluation phase since they were able to get their prototypes working faster due to a better initial design. This was demonstrated by the small difference in engineering changes between the two groups shown in Figure 5. Essentially, the control group was making changes to get their models working, while the advanced M&S group was making changes to be more competitive.



Conclusions

The results of this experiment validate the conclusions of the Sanders' report. When looking at the entire development effort and life-cycle implications, clearly SBA can deliver a product that is better, faster, and cheaper. The fact that this project showed a strong advantage to physics-based, integrated cost/performance models for relatively simple projects demonstrates that SBA can benefit a program regardless of size. The project also shows that the benefits of

SBA must be looked at in terms of the entire development effort and the life cycle vice a particular phase.

In our experiment, M&S would likely have increased the cost of this ACTD. However, since we had a much more refined, better performing design with better producibility and lower unit cost, we would expect a shorter Engineering and Manufacturing Development Phase (EMD) and lower production costs had this ACTD transitioned to an acquisition program. Since EMD and production entail far higher expenditures than an ACTD, investment in the advanced M&S tool would have been a prudent decision.

An additional finding of this project is the unexpected results that can occur when different acquisition reform initiatives are combined. Competition is a powerful tool that can motivate a contractor to develop better products at lower cost. SBA has proven its worth in making acquisition better, faster and cheaper. However, when we introduced SBA into a competitive environment, we found that our student contractor teams used M&S to gain a competitive advantage, not to reduce development cost and schedule.

If students in a classroom environment with nothing but pride to motivate them reacted in this manner, in all probab-



FIGURE 8. Advanced M&S Group Concepts

ity program managers can safely assume that real contractors with millions or even billions of dollars on the line would do the same thing. All of which presupposes the question, "What other acquisition reform initiatives might have complex interactions producing surprise results when combined with each other?"

The results also support Dr. Gansler's policy memorandum encouraging government and industry to move toward

... Using advanced M&S in a competitive environment may not save money or reduce the cost of that particular phase of the program. In fact, costs might actually increase in Concept Exploration and Program Definition and Risk Reduction phases.

SBA. However, the results also show that using advanced M&S in a competitive environment may not save money or reduce the cost of that particular phase of the program. In fact, costs might actually increase in Concept Exploration and Program Definition and Risk Reduction phases. Advanced M&S may fall into the category of requiring an up-front investment to attain large cost and schedule reductions in the long run.

As pointed out in the Sanders' study, large programs have no choice but to commit to M&S up front and to then plan their programs around these investments.⁶ But what about smaller programs that do not have the resources to invest



in advanced M&S? The results of this project appear to validate that these programs can also achieve strong benefits. Where are the resources for smaller programs going to come from?

The Sanders' report also found that currently no vehicle exists to get information on M&S capabilities and facilities to the programs that have the potential to use the assets.⁷ If SBA is to become a reality, resources and support must back it. The future success of SBA will be determined by the answers to these questions as part of the continuing challenge of implementing acquisition reform.

Future of SBA at DSMC

The benefits of SBA are now translated into a better education for APMC students at DSMC. By automating many of the calculations and demonstrating that students can now do much more of the design work through M&S, we added several more functional areas to the SEGV "mousetrap" project.

In addition to the design and simulation models, a life cycle cost model is now integrated into the M&S tool provided

the students. The focus of the project is now on practical application of Cost As an Independent Variable, including the Total Cost of Ownership executed in a streamlined acquisition development environment.

IPT and team building exercises conducted in program management, in essence, create the SEGV project teams. Manufacturing processes are now included in the producibility index calculation, better integrating lessons from Manufacturing Management. In addition, we added a Logistics Support Index to emphasize design for supportability from Logistics Management.

Earned Value is now an integral part of the exercise, and Test and Evaluation continues to play a strong role. Further, we are conducting a cost estimating exercise of the SEGV project and introduction of operational test considerations as pilot projects in the ongoing APMC 99-1 class.

Introduction of SBA has allowed students the opportunity to exercise critical thinking skills by making real-world

trade-offs among multiple competing functional areas. Moreover, introduction of SBA added no additional hours to the curriculum. By automating and interrelating calculations from different functional areas, SBA has served as an integration tool to improve the entire APMC curriculum.

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3. Ibid.
4. Ibid.
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7. Ibid.

Fred and Ginger? No, but close. It's Coast Guard Capt. Daniel Lloyd and his graceful dance partner, obviously enjoying the entertainment. Assigned to Section C, Lloyd was attending DSMC's Advanced Program Management Course (APMC 98-3) Graduation Dinner-Dance at the Radisson Plaza Hotel, Alexandria, Va., Dec. 16, 1998.

Photo by Richard Mattox



Large Government Programs and Program Management in the U.S.

A Historical Perspective

JOHN E. CAREY

What Department of Defense instructors don't teach aspiring program managers at the Defense Systems Management College is almost as important as what they do teach. Generally, students leave understanding that they are in for many challenges. What few understand, until much later in life, is that the record of managing large government programs in the United States is filled with stories of cost overruns, delays, fired contractors, false starts, and changed objectives. My favorite "case study" is the story of the Washington Monument.

The first idea of a monument to honor the father of the nation emerged in 1783 when Congress resolved "That an equestrian statue of General Washington be erected at the place where the residence of Congress shall be established." (Congress was meeting in Princeton, N.J., at the time.) A modern program manager would call this legislation the start of an Operational Requirements Document (ORD).

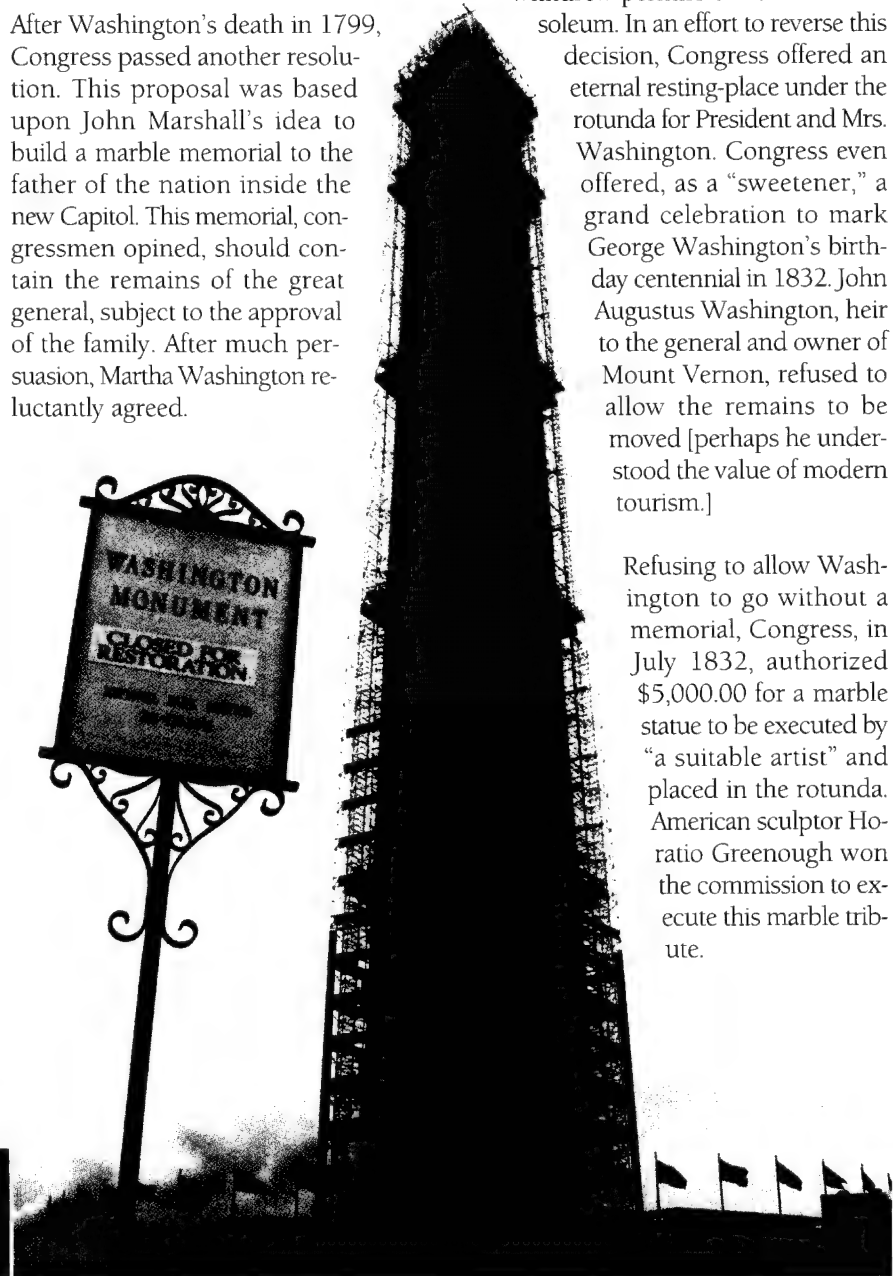
Later, when Congress selected the swampy banks of the Potomac just north of Alexandria, Va., as the new seat of government, city planner Pierre L'Enfant and President Washington chose a suitable site for this planned statue. Lack of funds forced the first delay in the project. After site selection, nothing hap-

pened [an environmental impact statement wasn't even required].

After Washington's death in 1799, Congress passed another resolution. This proposal was based upon John Marshall's idea to build a marble memorial to the father of the nation inside the new Capitol. This memorial, congressmen opined, should contain the remains of the great general, subject to the approval of the family. After much persuasion, Martha Washington reluctantly agreed.

After decades of congressional debate, and Martha's death, Washington's heirs withdrew permission for this mausoleum. In an effort to reverse this decision, Congress offered an eternal resting-place under the rotunda for President and Mrs. Washington. Congress even offered, as a "sweetener," a grand celebration to mark George Washington's birthday centennial in 1832. John Augustus Washington, heir to the general and owner of Mount Vernon, refused to allow the remains to be moved [perhaps he understood the value of modern tourism.]

Refusing to allow Washington to go without a memorial, Congress, in July 1832, authorized \$5,000.00 for a marble statue to be executed by "a suitable artist" and placed in the rotunda. American sculptor Horatio Greenough won the commission to execute this marble tribute.



Carey is a technical director at Techmatics in Arlington, Va. He is a 1981 graduate of DSMC's former Program Management Course.

Greenough's classical training resulted in a seated, bare-chested, toga-draped Washington of mythic proportions. Today, program managers would say, "the contractor deviated too far from spec."

When Greenough's Washington was unveiled in 1841, a shocked public and Congress rejected the monument. Most rejected the notion of the father of the nation about to enter a bath. Congress decided it was inappropriate for display in the Capitol. The statue was banished to the Smithsonian — where you can see it today.

Fortunately, a civic movement was starting, which advocated a towering obelisk to honor Washington. This group evolved into the Washington National Monument Society. George Marshall, partly in frustration over previous memorial attempts, agreed to become the Society's first president. Former President James Madison succeeded him.

Some will say because a society of "civilians" managed the project at this point, no comparison can be made to modern government program management — think again.

The project was a "teaming" of several civil engineering firms, and a series of program managers and staff who frequently rotated to new assignments. Sound like your program?

By 1836, 53 years after initial site selection, the society had collected \$28,000 in contributions. The cost estimate for the project at the time was \$1 million.

Nonetheless American architects were invited to submit design proposals [probably a lesson learned from the Greenough fiasco]. Well-known architect Robert Mills won the contest. Having already designed and supervised construction of a smaller obelisk honoring Washington in Baltimore, Mills proposed to evolve this design for the grander venue of the nation's capital.

But Mills couldn't resist the opportunity to embellish upon his already proven design. He wanted to add, around the base

of the obelisk, a circular colonnaded Greek temple 100 feet high. Behind each column he planned a statue of a great American. Above the central portico he wanted a colossal toga-clad Washington driving a chariot pulled by Arabian horses. Today we'd call this "gold plating."

Lack of funds [and probably some good taste on the part of the society] forced Mills to scale back his plan. In 1848 construction began. The cornerstone was laid on the Fourth of July, amid a grand spectacle. The *National Intelligencer* reported, "Few left the city, while great multitudes rushed into it The spectacle was beautiful to behold."

The July 4, 1848 ceremony undoubtedly started the tradition that still exists today. On July 4, 1850, while sitting through a number of lengthy speeches in sweltering heat at the base of the unfinished monument, President Zachary Taylor became ill and died five days later.

Construction progress was slow but steady. By 1852 the monument reached the 152-foot mark. At that point, a treasured gift from Pope Pious IX, a slab of marble from the Temple of Concord in Rome, was stolen. This turned out to be a program manager's nightmare — a political act of terrorism carried out by the "Know Nothings," who actively campaigned against Catholics in particular and all "foreigners" in general.

In 1853, through an illegal election, the "Know Nothings" gained control of the Monument Society. Soon after, however, the lawful patrons of Washington's monument regained control of the project.

As the Civil War began, work on the monument trickled to a stop. After reaching 156 feet, the stumpy monument stood for 16 years as an unfinished reminder of good intentions, bad politics, and mixed management.

As the nation's centennial neared, Congress passed and President Grant signed a law providing government funding to complete and care for the Washington Monument. Before construction con-

tinued, the Army Corps of Engineers discovered that the foundation would not support the estimated weight of the structure — thus commenced a yearlong project of rebuilding the foundation.

Engineers also discovered that the original design would not have formed an obelisk at all — but a square shaft with a marked point. The dimensions of the design had to be adjusted to conform to classical-obelisk dimensions.

By the end of 1883 the monument had reached the 410-foot mark, and the push for the top commenced. Completed in 1884, exactly 101 years after the first steps were taken on the project, a monument to the nation's first president graced the skyline. The exact amount of the cost overruns is difficult to determine — but is certainly large.

With scaffolding covering the monument, the story continues today as the long-awaited and delayed restoration and repair effort gets underway. Most of the funding is from private sources.

Next time you hear someone complain that "it is costing too much and taking too long" or griping about a program manager, remember the Washington Monument. To this day, it remains there for a reason: Even at the expense of cost overruns, false starts, delays, "terrorism," or changed objectives, some projects are worth seeing through to completion, regardless of the cost.

Author's Note: After distributing this article to several experienced historians and program managers, we learned that several famous U. S. building programs suffered from delays, cost overruns, and management irregularities. The U.S. Capitol, Kennedy Center, and the new Ronald Reagan Federal Building are just a few of the more interesting program management "case studies." I am told the dome of the chapel bearing John Paul Jones' remains at the U.S. Naval Academy was originally designed as a red terra cotta dome. The roof leaked, which necessitated a change to the metal dome we see today.

National Reconnaissance Office — Moving Toward the Learning Organization

Transition Gradual But Deliberate

CAPT. MICHAEL MORAN, U.S. AIR FORCE

For over 30 years, the National Reconnaissance Office (NRO) has acquired and operated the world's most advanced space-based intelligence capabilities. A covert, classified operation for most of those 30 years, NRO provided this service to the national and military leaders of the United States under the tightest security. In 1992 that veil of security was lifted to enhance NRO's ability to provide space-based intelligence to a larger set of customers.

With the "fact of" NRO's existence now declassified, we have one of the first opportunities to see into the NRO and discover, in part, how they plan to continue providing this critical national intelligence service in an era of rapid technological change and governmental restructuring. What we will see is a close coupling between the NRO's strategic planning activities and the concept of the learning organization.

A Clear Vision and Defined Goals

The first product of the NRO's strategic planning efforts, its vision statement, gives us a clear indication of the organization's emphasis on the future and the means to achieve success: *Freedom's Sentinel in Space: One Team, Revolutionizing Global Reconnaissance.*

Moran is currently a Program Element Monitor for Space Based Infrared Systems, The Pentagon, Washington, D.C. He previously served as the Signals Intelligence Program Resource Liaison at the National Reconnaissance Office headquarters. A graduate of DSMC 98-2, Moran holds a master's degree in Systems Management from the University of Southern California and is a Certified Program Management Professional.

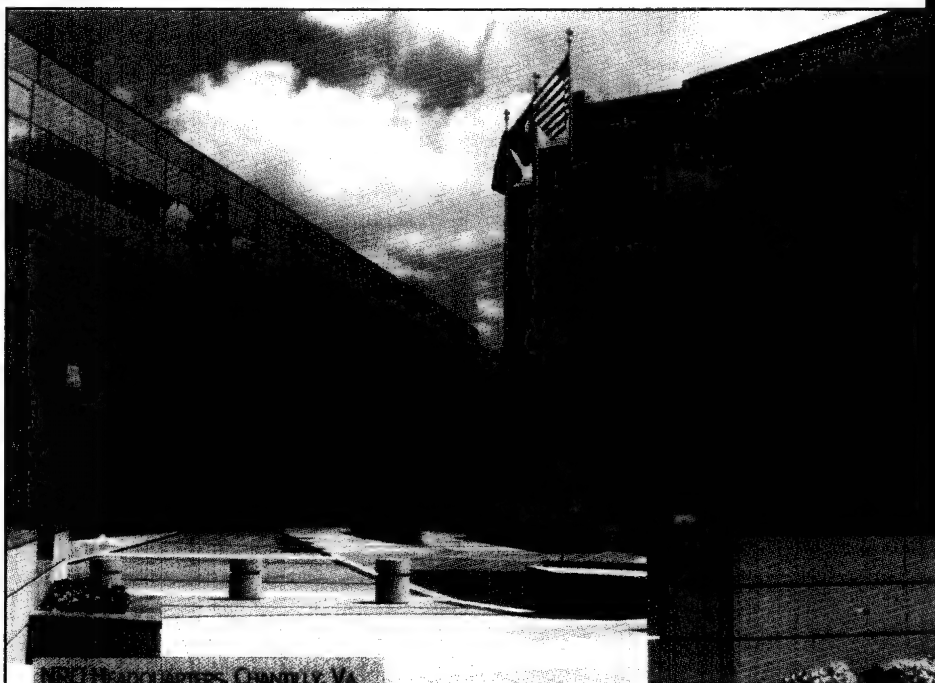
The first four words, "Freedom's Sentinel in Space," capture the essence of the vision in terms that each of us can imagine...a single sentinel, vigilant, protecting the cause of freedom from a remote, lonely post in space.

A closer examination of the next two words, "One Team," immediately tells us the means by which the NRO plans to achieve its desired future state. The means — one that is perhaps not unique among organizations — is through a single, interdependent team of people.

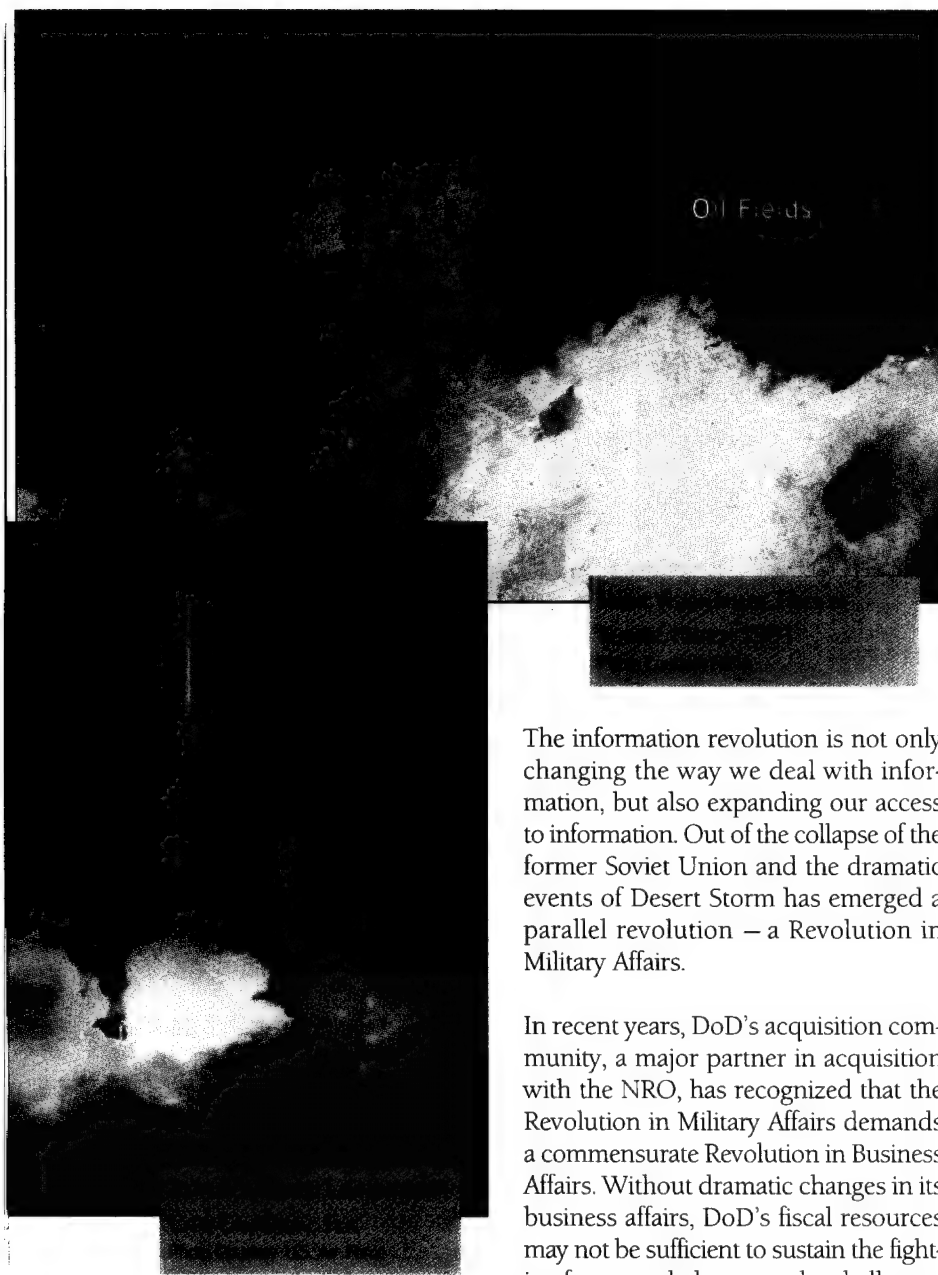
This is not so surprising a revelation. Many organizations recognize the importance of people to achieve their mis-

sion, but they don't always recognize the difference and the importance of those people working as a team.

The NRO's focus on "One Team" is all the more challenging a target considering the number and diversity of the workforce it employs. Officer, enlisted, and civilian members of all the armed services, as well as government personnel from the Central Intelligence Agency and numerous other intelligence organizations make up this diversified workforce. As difficult as it can be to merge a 30-person office into a single team, trying to achieve the same synergy among the NRO's much larger workforce is a substantial undertaking indeed.



NRO HEADQUARTERS, CHANTILLY, VA
Photo courtesy NRO



While the two words "One Team" provide us insight into the means, the last three words show us the NRO's future state. "Revolutionizing Global Reconnaissance" recognizes both the chartered mission of the NRO—to provide space-based reconnaissance for the nation—and the need to do so in a way that is dramatically different than today.

The information revolution is not only changing the way we deal with information, but also expanding our access to information. Out of the collapse of the former Soviet Union and the dramatic events of Desert Storm has emerged a parallel revolution—a Revolution in Military Affairs.

In recent years, DoD's acquisition community, a major partner in acquisition with the NRO, has recognized that the Revolution in Military Affairs demands a commensurate Revolution in Business Affairs. Without dramatic changes in its business affairs, DoD's fiscal resources may not be sufficient to sustain the fighting force needed to meet the challenges of the next century.

The NRO's vision responds to this need for dramatic change and has begun that change, in part, by focusing on systems. The combination of systems thinking with a single, interdependent team of people will result in a powerful space-based capability, able to meet our intelligence needs in an uncertain future.

Taking their strategic planning one step further, NRO's leadership followed their vision with specific goals for the organization. Using the balanced score card approach, shown on the next page, they aligned their goals under four primary areas: customer satisfaction, process improvement, financial management, and employee satisfaction. Within each of the four areas, they further defined their goals to an even greater level of specificity.

Customer satisfaction requires that the NRO provide assured, timely, global coverage; provide tailored information on-demand, to customers worldwide; and, through teaming with our mission partners, establish and maintain strong customer relationships.

Process improvement requires that the NRO be the government's best system acquisition and operations organization and conduct an aggressive, customer focused research and development program that fosters innovation and creativity.

Financial management requires that the NRO develop and sustain a financial management process that optimizes the use of our resources; and ensures government and contractor financial systems provide reliable, timely, and accurate information.

Finally, **employee satisfaction** requires that the NRO create and maintain a world-class NRO workforce who will revolutionize global reconnaissance; provide a quality work environment that enables our workforce to excel; and develop a streamlined, open, corporate management climate.

The Learning Organization Concept

So the question, then is "How do the NRO's strategic planning steps relate to the concepts of the learning organization and to systems thinking?"

The learning organization concept has gained notoriety by Peter Senge of MIT's Sloan School of Management.¹ Dr. Senge serves as the Direc-

tor of the Center for Organizational Learning where he has for many years espoused the concept of the learning organization as a means of improving the organization and its effectiveness. Senge describes the concept based on five learning principles: personal mastery, mental models, shared vision, team learning, and systems thinking.

"Learning in organizations means the continuous testing of experience, and the transformation of that experience into knowledge — accessible to the whole organization, and relevant to its core purpose." In these words Dr. Senge describes the core concept of organizational learning.

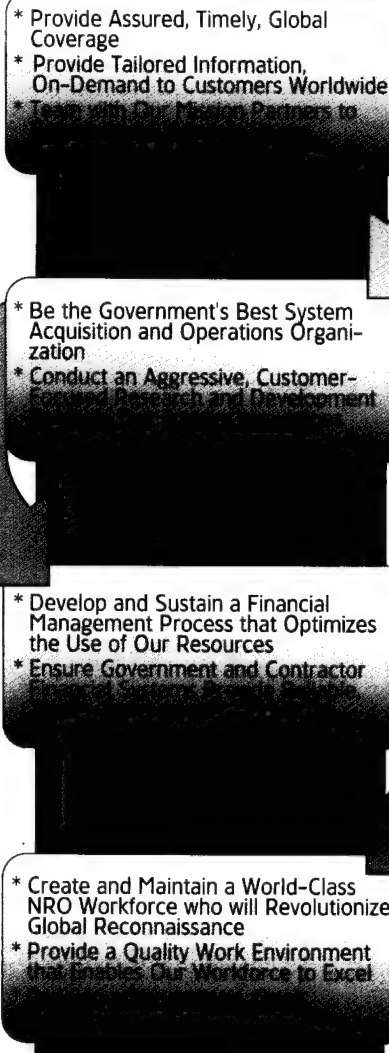
John Redding, in his article, "Hardwiring the Learning Organization," describes the key premises of the learning organization:²

- Organizations and groups, not just individuals, learn.
- The degree that an organization learns determines its capability to transform itself to meet demand for fast, fundamental change.
- A company is a learning organization to the degree that it has purposefully built its capacity to learn as a whole system and woven that capacity into all of its aspects: vision and strategy, leadership and management, culture, structure, systems, and processes.

Former Secretary of Defense William J. Perry, in his response to the Vice President's charge to reinvent government, supported the learning organization concept.³ Secretary Perry established three-year DoD acquisition goals centered on delivering great service, fostering partnership, and internal reinvention.

Within his "delivering great service" area, Perry defined goal four as, "Create a world-class learning organization by offering 40 or more hours annually of continuing education and training to the DoD acquisition-related workforce." The NRO, as a joint DoD and Central Intelligence Agency, has also picked up the concept in several ways.

The Balanced Scorecard



Human Resource Management Group

The NRO's Human Resource Management Group (HRMG) has begun its strategic planning process to support that of NRO senior leadership. Within HRMG's strategic plan, you can read the words, "create a continuous learning organization." These words are not mere rhetoric. HRMG has sponsored many efforts to expand this learning organization concept into the NRO, and has performed several supporting efforts.

Among these efforts are: 360-degree feedback pilot programs; workforce analy-

ses; implementation of self-directed work teams; support of other offices' strategic planning processes; and NRO core competency studies.

Part of these efforts has included the use of scenario planning, which assists managers in making decisions by looking at the possible outcomes of their decisions given different situations. Through the scenario development approach, HRMG provides a technique that, with continuous application, will expand the ability of the NRO workforce to take actions to improve the organization.

HRMG has recognized, as Joyce Thompsen did in her paper "Achieving Return on Critical Knowledge," that the ability to manage and leverage intellectual capital — the knowledge and competencies of people — is the surest predictor of continued success.⁴

Intranet

The NRO has also linked itself to other government agencies via an intranet. This intranet provides a critical ability to share knowledge among all the geographically dispersed NRO locations and with non-NRO organizations. This tool provides a means to share information, share experiences, and therefore share learning.

However, there remain difficulties in interacting with the NRO's industrial partners who are a vital part of the NRO team. Just as the Internet is still in its infancy, so too this intranet requires a great deal of expansion to other information sources and an increase in its use as a tool to aid in the continuous learning process.

Chief Learning Officer

To continue moving toward the learning organization and resolve issues such as the evolution of the intranet mentioned above, the NRO could choose to establish a Chief Learning Officer (CLO). Maria Nathan uses the CLO term to refer to a transformational leader in an organization.⁵

In her article, "The Nonprofit Executive as Chief Learning Officer," Nathan assigns the CLO five major responsibilities:

- Exemplify the learning organization.
- Shape a vision of the organization as a learner.
- Design the organization for learning.
- Empower the people to learn.
- Assess learning.

Within the NRO, I believe several individuals fit this description, though none is yet referred to as the NRO's CLO.

The first is Keith Hall, the Director of the NRO. His efforts in strategic planning have brought about a fundamental change in the NRO's focus on major improvements in the organization. The process he used was developed around three characteristics: senior management commitment and participation, senior leader ownership of processes and products, and specific individual and organizational accountability for all activities and outcomes.

Another excellent candidate is David Kier, the NRO's Principal Deputy Director. Kier first established the NRO's acquisition steering group. Under this group, major efforts to build a foundation of continuous learning and improvement in acquisition and personnel management have been implemented. Kier brought with him new ways to acquire complex systems that he has shared in the NRO.

Further, he championed earned value management (EVM) and recommended new techniques to implement EVM effectively in the NRO. Kier attempts to break through what Ray Strata describes as the "bottleneck of management innovation" in his [Strata's] *Sloan Management Review* article, "Organizational Learning – The Key to Management Innovation."⁶ The NRO and its industry partners have long been able to sustain process and product innovations. Innovations of management are often the more challenging paradigm shifts to implement over time, particularly if the office continues to be successful in applying established processes.



Implementation a Significant Challenge

One of the most significant challenges of the learning organization is implementation. Ken Starkey's article titled, "What We Can Learn from the Learning Organization?" reviews several books including "Rethinking the Future," edited by Rowan Gibson.⁷

In the review, Starkey notes one of two levels of change pointed out by Peter Senge. This second level of change concerns the ways in which we organize ourselves to support learning.

Within the NRO, as I suspect within many organizations, the focus has been on individual learning. But the NRO has expanded this focus in a significant way to include learning and training as a group, and institutional sharing of learning experiences. NRO achieved this expanded focus through its Acquisition Center of Excellence (ACE).

The ACE provides individual training in a variety of acquisition areas at a classification level sufficient to address all NRO topics. But the ACE goes further. It provides just-in-time training to teams of people who will perform complex, acquisition source selection activities.

Essentially, the ACE captures lessons learned from previous teams and modifies their instructions to incorporate these new techniques. This institutional process of continuous learning is a true manifestation of the learning organization. The NRO's challenge will be to extend this concept of the learning organization across the NRO's entire workforce.

Jim Collins captures this challenge for each of us in his article, "The Learning Executive."⁸ He points out that it is up to each of us to "respond to every situation with learning in mind." He asks us the question, "How would your day be different if you organized your time, energy, and resources primarily around the objective of learning instead of around performance?" In my estimation, this is truly a revolutionary way to consider implementation of the learning organization.

One particular NRO office has come close to implementing the learning organization in this way, through the establishment of learning not as a means to an end but as an end in itself. This office has incorporated learning as an end by carrying the concept into their strategies and goals.

Collins describes a technique used by the Granite Rock Company to institutionalize the learning organization. Granite Rock has each employee set annual goals in the format "Learn XXX" so that I can XXX." This approach links continuous learning to performance and ensures the learning objective continues year after year. Translating vision statements about learning into institutional action will require innovative techniques such as this.

Transition — Gradual But Deliberate

The National Reconnaissance Office is moving toward the learning organization...gradually in some ways, deliberately in others. The focus of senior management on the principles of the learning organization and the efforts of several offices such as HRMG and ACE, who are actively implementing the learn-

ing organization concepts, are helping to put the NRO on a path to continuous learning.

The close coupling between the NRO's strategic planning activities and the concept of the learning organization has formed a bridge that, ultimately, the NRO is crossing to achieve its vision:

Freedom's Sentinel in Space: One Team, Revolutionizing Global Reconnaissance

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7. Starkey, Ken. "What We Can We Learn From the Learning Organization?" *Human Relations* Vol. 51 Issue 4 (April 1998): 531-546.
8. Collins, Jim. "The Learning Executive." *Inc* Vol. 19, Issue 11 (August 1997): 35-36.

College DGL Program Still Attracting Best and Brightest

The Defense Systems Management College continues to provide students expert advice and experience, straight from the mouths of DoD's best and brightest program managers, through its Distinguished Guest Lecturer (DGL) program. We invite you to read what the Under Secretary of Defense (Acquisition & Technology), Dr. Jacques S. Gansler had to say about one of our recent guest lecturers in a speech to the National Contract Management Association Dec. 3, 1998.

"The fact that the Department of Defense is such a different place from what it was five years ago is due to individuals who have been willing to take risks — people like Terry Little, the Joint Air-to-Surface Program Director at Eglin Air Force Base, Florida. The Air Force had set a cap of \$400,000 for each JASSM [Joint Air-to-Surface Standoff Missile] unit (compared to an initial program estimate of \$700,000 per unit). But Terry Little and his team are going to try to bring that price down to \$300,000.

"Many don't believe this can be done. But, we are going to encourage Terry to keep on trying. If he succeeds, all the more power to him. If he can't do it, we can't fault him for trying — and he will still have achieved approximately a 50-percent cost reduction. Terry is taking a conscious and well-thought-out risk. *And that's what we need more of.*"



Under Secretary of Defense, William J. Perry presents the Under Secretary of Defense Medal for Meritorious Civilian Service to Terry Little (new JDAFT Program Manager, PIC) and his wife, Elaine Little, daughter, Sherry.

DISTINGUISHED GUEST LECTURER

APMC "Turnabout" Makes Everyone a Learner, Everyone a Teacher

JDAM Case Study Facilitating Open Dialogue, Learning, Innovation

MAJ. TROY SNOW, U.S. AIR FORCE • DR. MARY-JO HALL



DISTINGUISHED GUEST
LECTURER TERRY LITTLE,
FORMER JDAM
PROGRAM MANAGER.



FRONT ROW, FROM LEFT: STEVE YARNALL; ARMY LT. COL. ED O'CONNOR; RUTHANNE ZOMBOLAS; PATRICIA HAGAN; JAMES SENCINDIVER; GREG MAKRAKIS. BACK ROW, FROM LEFT: AIR FORCE LT. COL. JERRY WORSHAM; AIR FORCE LT. COL. SCOTTY FAIRBAIRN; AIR FORCE LT. COL. JONATHAN SUMNER; TERRY LITTLE; FRANK SWOFFORD; ARMY MAJ. ETHAN COLLINS; NAVY CMDR. TERRANCE HAID; ALBERT GRIGGS.

An old axiom states that if you want to learn something — a concept, an idea, a theory, or a skill — then teach it. With that in mind, APMC 98-3 students literally took "center stage" at the September Distinguished Guest Lecturer (DGL) session.

Traditionally, DGLs deliver their presentations, followed by a brief, struc-

tured question-and-answer session. September's DGL, however, departed from that traditional approach.

Led by Ruthann Zombolas, the student selected by peers as the Section C representative, 12 students representing all APMC sections asked questions of September's DGL — former Program Manager of the Joint Direct Attack Munitions (JDAM) Program Office, Terry Little.

This "turnabout" approach, moving more toward encouraging students to ask "their" questions, established open dialogue between lecturer and students from the *beginning*.¹

Why JDAM?

The JDAM program, which is still an ongoing program, converts dumb bombs to smart weapons using commercial practices. Originally begun as a tradi-

Snow and Hall are Professors of Systems Acquisition in the Program Management and Leadership Department, Faculty Division, DSMC.

tional program in 1991, in 1994 Little and his team streamlined the JDAM program using the principles, practices, and processes of Acquisition Reform, with extraordinary results.

Since the Office of the Under Secretary of Defense (Acquisition and Technology) and Defense Acquisition University were interested in the use of case studies as a means to share lessons learned and to provide insight to all sides of an acquisition relationship, DSMC, in partnership with Boeing, began developing a JDAM Case Study in May 1997.² The JDAM case study highlights how one particular office – the JDAM Program Office – implemented the policies and strategies emerging from Acquisition Reform and all it embodies.

This joint DSMC-Boeing JDAM Case Study is actually designated “JDAM I” because it focuses on one particular time in the life of the program.³ For this reason, we asked students to limit their questions to this snapshot in time.

During week 13 or 14, the students begin JDAM II, a “present” look at the program

The Office of the Under Secretary of Defense (Acquisition and Technology) and Defense Acquisition University were interested in the use of case studies as a means to share lessons learned and to provide insight to all sides of an acquisition relationship.

in terms of real-time programmatic and issues. During JDAM II, the DGL is the current JDAM Program Manager, Oscar Soler.

DSMC’s APMC students use the case study to assess and evaluate one outstanding example of cutting-edge Acquisition Reform. Rather than a detailed analysis of functional and programmatic aspects, the JDAM I lesson focuses on understanding leadership and the transformation dynamics of *cultural change*.

Toward that end, DSMC established the following Terminal Learning Objective for JDAM I:

Given the early Phase II in the JDAM program, critically assess and evaluate the transformation decisions, strategies, processes, and techniques the government and industry leaders used to implement Acquisition Reform.

After a thorough study of the case, students develop and prioritize their questions for the DGL. Actually, the learning process starts with each student’s individual reading of the case study, aided by a concise set of structured, self-help questions.

- What are your general impressions (who, what, when, where, why, how)?
- Who are the primary protagonists? What were their dilemmas, success issues?
- What were their assumptions? What decisions did they make? Why? How?
- What are your assumptions?
- What are the primary issues?
- What are your recommendations for action?
- What are the important events?
- How much time elapsed during the events described?
- Who are the players?
- What are their backgrounds?
- What are their motivations?
- What are their attitudes toward other characters and events?
- What does the organization look like?
- What are the reporting relationships?
- Who has influence over whom?

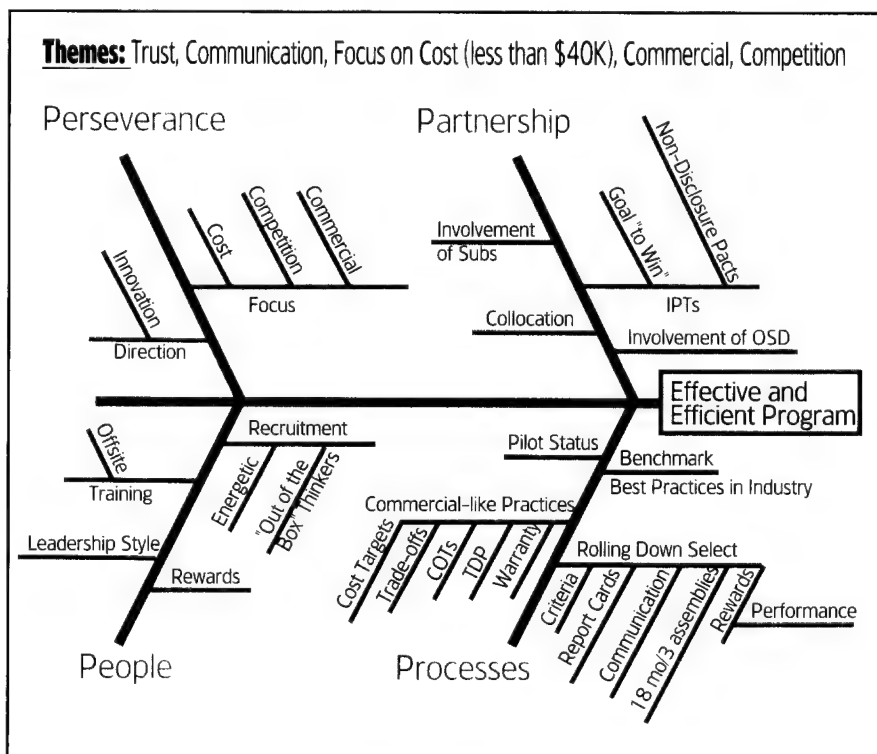


FIGURE 1. Ishikawa (Fishbone) Diagram

- What are the cultural overtones?
 - What are the histories and traditions of the organization and teams?
 - How do the structure, culture, history, and traditions factor into the current situation?
 - What is the central problem, decision, or opportunity to be analyzed?
 - What is the case about?
 - Does organizational change play a role? If so, what forces exist both for and against change?
 - Which change forces are most compelling? What can be done to either augment or mitigate the change?
 - What is the operating environment like?
 - What external factors impact the people, teams, and organization?
 - What is the industry like? Is it competitive? Who are the competitors?
 - What are the program or team strengths and weaknesses compared to competitors?
 - What are the socioeconomic, environmental, and technical considerations that impact the program?
- After developing their questions, students follow this effort by a workgroup

discussion (six or seven students) to collaborate on an individual interpretation of the case. This individual interpretation uses another set of questions to guide students:

- Who are the primary players? How are they motivated? What were their leadership styles?
- What are the important events discussed in the case? When did the events take place? Who was involved?
- What is the operating environment for the case? What is the external environment like? What is the internal environment like?
- What are the primary problems the protagonists face?

The third aspect of the case study was a section discussion of the dominant themes throughout the case study: People, Processes, Partnerships, and Perseverance. The Ishikawa (Fishbone) Diagram (Figure 1) visually identifies and categorizes root causes of program success.

After analyzing and synthesizing the information in the case study, students compare the leadership and cultural dynamics manifested in the JDAM Case Study, to the Kotter model for leading change. Depicted in Figure 2, this model is developed in John P. Kotter's work, *Leading Change*.⁴

The final exercise included brainstorming questions the students wanted to ask Little. These questions were prioritized within each workgroup and then at the section level. Additionally, each workgroup selected a representative for the DGL session. From these five representatives in each section, one person was selected to represent their section on the discussion panel.

Assessing the Value-Added

At the end of the session, students assessed the value-added of the class. The data indicate that 82 percent of students believed the length of the class — three-and-one-half hours — was

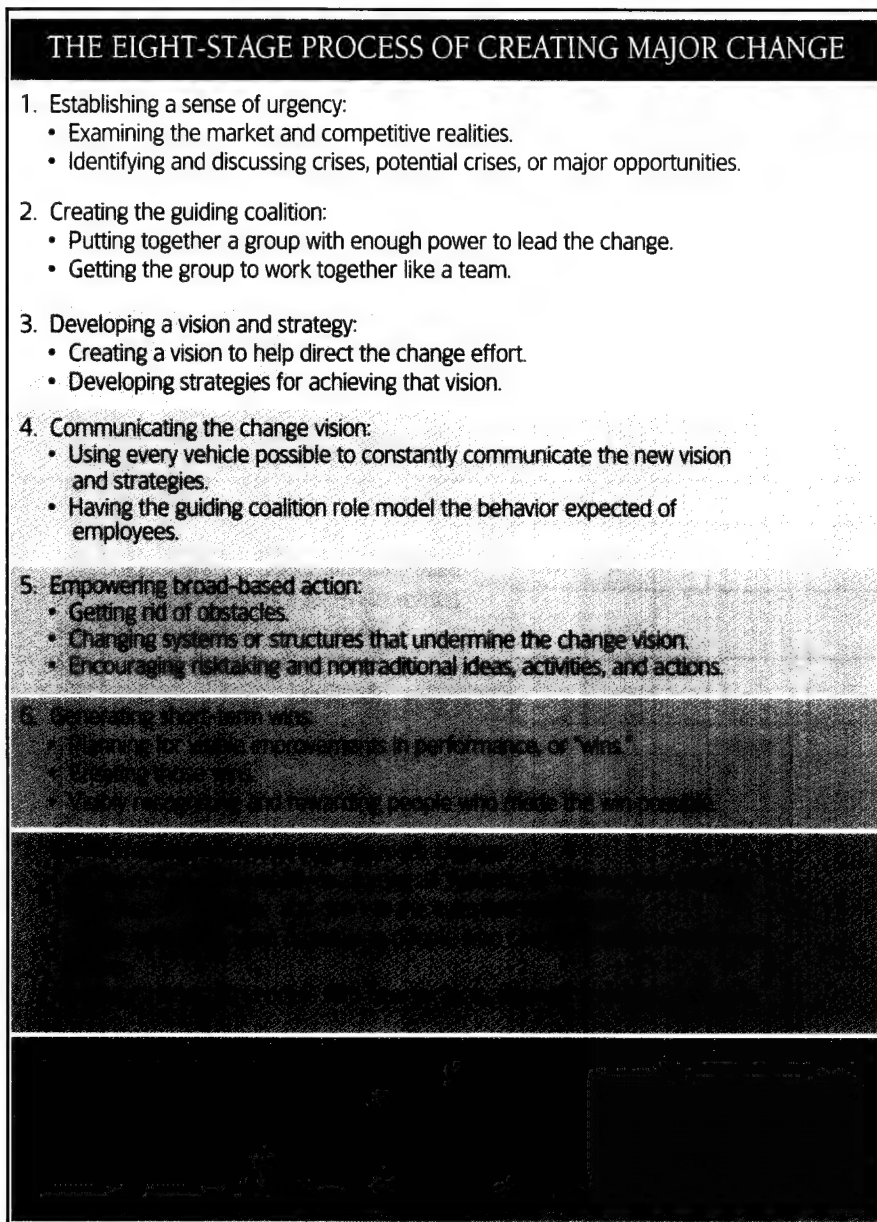


FIGURE 2. Kotter Model for Leading Change

just right or even too short to assess the issues within the case.

The bar chart (Figure 3) displays the relative value students assigned to each part of the lesson. Overall, students felt that the information and learning methodology added value.

In an effort to continuously improve the quality of instruction, the faculty conducted a post-instruction review and recommended improvements to the case study. The data indicate a slight drop in the value added from the case discussions (Figure 3) to the comparison with Kotter's Model for Leading Change (Figure 2). Experience from the classroom was that the JDAM case too easily fit this change model, and the analysis did not provide an appropriate challenge to the students.

As a result of that assessment, improvements are being made to further challenge students' critical thinking skills. The Definition of Acquisition Reform segment (Figure 3) received the lowest score, suffering, in many cases, from lack of time. Since this is important but not an Enabling Learning Objective, it will

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be switched to another class in APMC 99-1.

Acquisition Reform will continue as one of the dominant themes, not only within APMC, but also throughout the entire DSMC curricula.

Editor's Note: For information on attending a DSMC course, visit <http://www.dsmc.dsm.mil/registrar/applic.htm> on the DSMC Web site.

ENDNOTES

1. A requirement that students develop questions for this turnabout DGL session was actually built into the curriculum as part of the JDAM Case Study.
2. Harman, Dr. Beryl A. and Daniel G. Robinson, "DSMC & Boeing Cultivate an Unconventional Educational Partnership Beyond the Norm," *Program Manager*, Vol. XXVII, No. 4, DSMC 145, July-August 1998.
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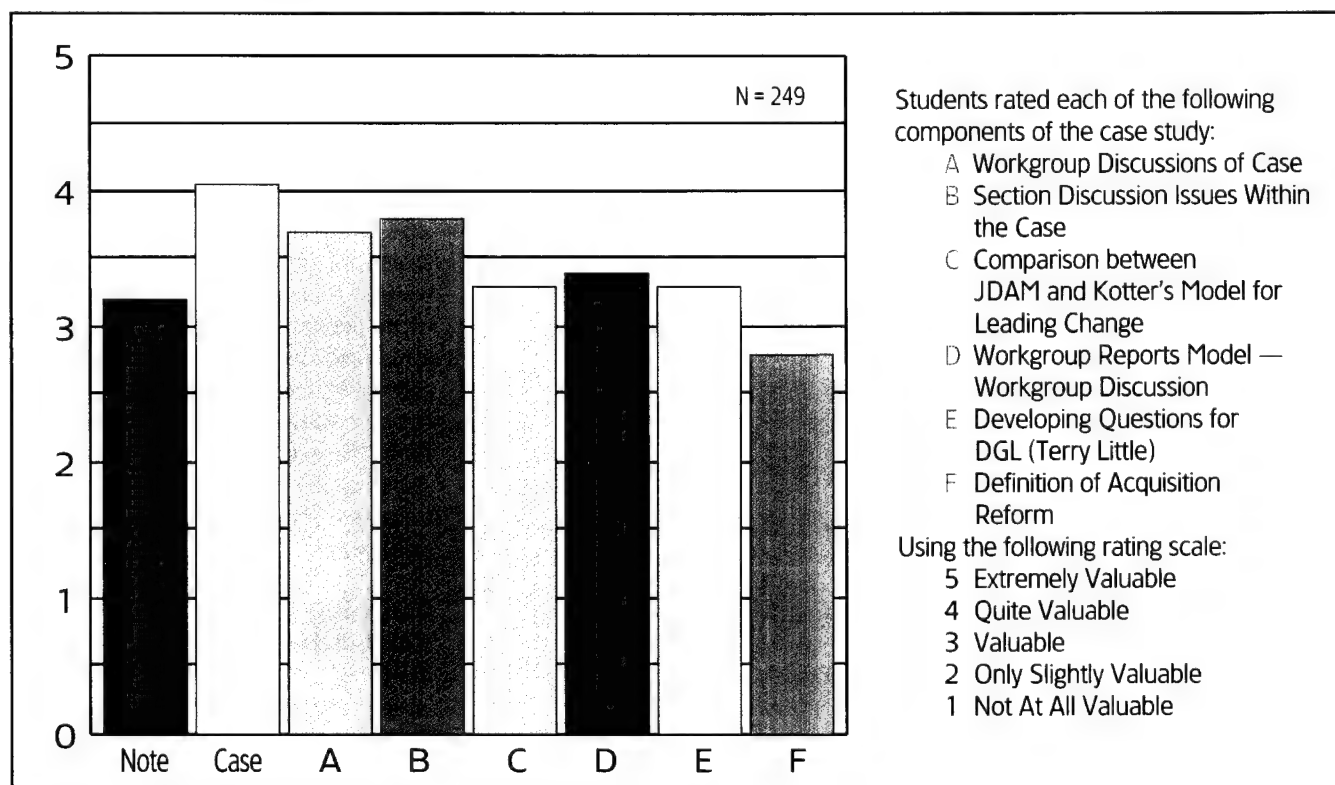


FIGURE 3 JDAM Case Study Survey Results

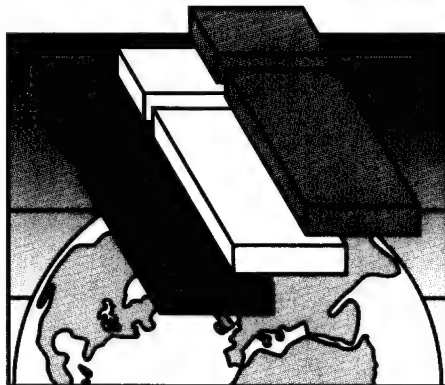
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Researchers, both national and international, interested in or involved with acquisition are invited to submit papers for the *1999 Acquisition Research Symposium*. We encourage your participation and welcome your contribution to the success of this Symposium.

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- ***Federal Acquisition and the Political Process***
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- ***Outsourcing and Privatization***

PAPER GUIDELINES

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3. Center name(s) of author(s) under title.

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5. Format the rest of the paper as two text columns of equal width.
6. Graphics and/or charts can either be whole page, half page, or quarter page.
7. The font, font style, and font size should be Times New Roman, Regular, Size 12.
8. Include in your paper a one-page *abstract* that includes a concise statement of the problem/research question and the scope and method of your approach. The rest of the paper should have the following: *Introduction, Body of the Paper, Conclusions, and References/Endnotes*.
9. Limit your paper to 15 pages.



TRADOC Gets Help from Acquisition to Install Distance Learning

JIM CALDWELL

FORT MONROE, Va. (Army News Service, Dec. 8, 1998) — Training and Doctrine Command is getting valuable help in making sure that the Total Army Distance Learning Program is fully operational by 2010.

The Army's smallest Acquisition Category I team is overseeing contracting for the construction and purchase of facilities and equipment for 745 distance learning classrooms around the world.

"Altogether we have about 27 people," said Gary Winkler, TADLP program manager. "For a program this size — a billion to \$2 billion — there's normally an organization of 70 to 200 people executing the program."

The program manager is also the first one ever assigned to TRADOC by the Assistant Secretary of the Army for Research, Development and Acquisition.

Another thing unique about the TADLP PM is its location.

"It's very unusual that a PM's office is in the same building or on the same installation or in the same state as their functional proponent," Winkler said. "Right now, I'm across the hall from Col. [Christopher] Olson [TRADOC TADLP chief]."

"It works out really well because all the while we're acquiring the system, we need TRADOC

to tell us what their requirements are at a detail level.

"The customer — TRADOC in this case — always sets the functional requirements, and then the PM executes those functional requirements. We determine the technical requirements and actually acquire the system, provide for the life cycle funding, and field the system."

For the next 12 years, Winkler's team will manage the building of the worldwide distance learning system. The project is divided into two phases. Phase One includes fiscal years 1998-99.

By the end of FY 99, Winkler thinks 150-200 fully equipped distance learning classrooms will be completed in the United States for the active Army, U.S. Army Reserve, and National Guard. Work will have begun on sites in Europe and Korea, too.

The first classrooms will be able to originate as well as receive training. But only three prototypes will have local area networks. LANs give the sites access to the Internet so web-based and interactive CD-ROM training will be available to students.

In Phase Two, the rest of the classrooms will be built, LANs will be operational, and several deployable distance learning packages will be created.

Phase Two also includes giving the classrooms the capability to run simulations.

"We're doing the best we can to keep costs down and standardize our equipment," Winkler said. "We get economies of scale in purchasing computers, really good computers, for \$1,400 apiece. Everything we're putting in the distance learning facilities has warranties."

A typical distance learning classroom has 16 computers. Each computer has a six-year warranty with on-site parts and labor included. If, during the warranty period, the computers become outdated or replacement parts are no longer available, the supplier will install a new computer with the same capabilities.

Actually building the system will cost less than to maintain it. Most of the distance learning system bill will be for operations and sustainment, according to Winkler.

"O&S means providing funding for classroom managers — somebody on site to help students," he said. "It provides funding for system administrators and network administrators to keep the networks up and running, to do account

movements, and control student and user accounts and passwords.

"O&S includes maintenance, utility bills, VTT (video teletraining) usage, and paying for replacing computers every six years."

New technology developed before 2010 will not make the distance learning system obsolete, because of the warranties and O&S money, Winkler said.

"TRADOC is developing distance learning courseware for the lowest common denominator machines, so there shouldn't be a problem running courseware designed for lower-capacity machines," he said. "Some courseware may need to be reconfigured, but that's a small task compared to recreating the contents of a course."

Editor's Note: Caldwell is a writer with Training and Doctrine Command's Public Affairs Office at Fort Monroe, Va. This information is in the public domain at <http://www.dtic.mil/armylink/news/> on the Internet.

World-Class Education

DSMC Measures Up Internationally

RICHARD KWATNOSKI

This was a banner year for the DSMC international acquisition education program. Expansion of our international acquisition education program received some impetus from Secretary Cohen's policy memorandum of March 1997. In this memorandum, he stated that "training for program managers and other Acquisition Workforce personnel will include sufficient instruction in the policies and procedures of international armaments cooperation programs to enable them to develop and execute such programs successfully."¹

While DSMC offers a family of three one-week international acquisition courses, this article highlights significant international events of the past year, beyond the scope of our normal course offerings. The following discussion focuses on international acquisition educational high points of 1998.

Annual International Acquisition/Procurement Seminar — Atlantic 10TH ANNIVERSARY SEMINAR

The International Defense Educational Arrangement (IDEA), comprised of equivalent defense educational institutions in the United States, United Kingdom, Germany, and France held its 10th annual seminar at the Centre des Hautes Études de l'Armement (CHEAr) in Paris, France, during the week of July 8-12, 1998. This was the most successful Atlantic seminar to date, with about 130 attendees from the four participating IDEA nations, and 11 additional nations: Australia, Belgium, Canada, Denmark,

Italy, Japan, The Netherlands, Portugal, Romania, Singapore, and Spain.²

Ingénieur Général de l'Armement Jean-Paul Gillybouef, the Deputy Director of the Délégué Général pour l'Armement, provided a stirring keynote address.³ Noting with pleasure the opportunity to address the participants of the seminar, which aims to improve international defense cooperation, he stated that the French strongly believe that this "IDEA"

is a very important one. He went on to suggest keywords for the next century, a century of communication based on international teamwork: "people, flexibility, quality, and trust."

The United States was well represented during the seminar by Alfred Volkman, Acting Deputy Under Secretary for International & Commercial Programs, who provided the U.S. national presentation.

Training for program managers and other Acquisition Workforce personnel will include sufficient instruction in the policies and procedures of international armaments cooperation programs to enable them to develop and execute such programs successfully.

Kwatnoski is the Director of International Acquisition Courses, Executive and International Department, School of Program Management Division, DSMC.

The 11th Annual International Acquisition/Procurement Seminar – Atlantic, will be held June 28 – July 2, 1999. DSMC will host the 11th Annual Seminar at Fort Belvoir. Watch the DSMC Web site (listed at the end of this article) for future updates.

Annual International Acquisition/Procurement Seminar — Pacific **INAUGURAL SEMINAR**

Encouraged by 10 successful Atlantic seminars, DSMC began a similar initiative in the Pacific Theater. This initiative began bilaterally with the Australian Defence Force Academy, Canberra, Australia. The First International Acquisition/Procurement Seminar – Pacific was conducted September 28-30, 1998, in Canberra. Other nations that participated and provided national presentations were Japan, New Zealand, Singapore, and South Korea. Other nations sending representatives were Canada, Poland, and Thailand. About 130 attended the Seminar.

Australia, as the host, provided the bulk of the speakers, which included such notable Australian Defence officials as Garry Jones, Deputy Secretary Acquisition, Defence Acquisition Organisation; Marilyn McPherson, First Assistant Secretary, Capital Equipment Program; and Maurice Hermann, Director General, Exports and International Programs. Navy Rear Adm. Lenn Vincent, Commandant, DSMC, and Gil Watters, Director General Acquisition, Finance and Reporting, Defence Acquisition Organisation, conducted a lively panel discussion on Defense Acquisition Reform issues in the United States and Australia.

The current plan is for the Korean Institute for Defense Analysis (KIDA) to host the second Seminar in Seoul during September 1999. Watch the DSMC Web site for updates on this.

U.S. — Japan Project Management Seminar

DSMC hosted and provided educational oversight for this July 15-17, 1998, Seminar, at the request of the Director, Pacific Armaments Cooperation in the

Office of the Under Secretary for International & Commercial Programs. The University City Science Center (a consortium of educational institutions), and the Strategic Management Group (a private contractor) conducted the Seminar. Funding was provided through grants from the Japan Industry and Technology Management Program, managed by the Air Force Office of Scientific Research.

The attendees, all U.S. DoD personnel, stated that the seminar was valuable in learning to work with our Japanese allies. This was not the only recent DSMC activity devoted to increasing our mutual understanding of cooperative acquisition. DSMC professor, Richard Kwatnoski, traveled to Japan in December 1997 to provide a series of three lectures on U.S. defense acquisition, international cooperative acquisition, and cooperative projects in the Pacific Rim at the National Institute of Defense Studies in Tokyo. In November 1998, Japanese Defense officials visited DSMC to gain insight into the defense procurement methods of the United States.

Biennial International Defense Cooperation in Armaments Course for U.S. Pacific Command (USPACOM) Personnel

September 23-25, 1998, DSMC and Australia conducted a special, tailored offering of an international acquisition course in Canberra, Australia, for Office of Defense Cooperation personnel in the Pacific Theater. Two DSMC professors, Richard Kwatnoski and Don Hood, presented this special offering, along with Bruce Bade, the Director, Pacific Armaments Cooperation, Office of the Deputy Under Secretary for International & Commercial Programs; and Ronald Neubauer, the Associate Deputy General Counsel, Office of the Deputy General Counsel (International Affairs). This was the second special offering for USPACOM; the first was presented in September 1996 in Singapore. Plans are underway to conduct the third offering in September 2000 at an undetermined Pacific location.

Semiannual International Acquisition Forums

At the request of the Office of the Secretary of Defense (OSD) and each Service's International Programs Office (IPO), DSMC arranges and hosts a semiannual forum on contemporary international acquisition issues and topics. This is an opportunity for those actively engaged in cooperative acquisition to hear the latest and discuss the difficult international issues of the day. The forums are chaired by the Deputy Under Secretary for International & Commercial Programs.

The fifth and final forum for 1998 was held Dec. 2, 1998, where globalization and security, training for international armaments cooperation, and reinventing security cooperation were lively topics.

Author's Note: Information on DSMC's international acquisition education program, including monthly updates on international seminar activities, is available at <http://www.dsmc.dsm.mil> on the DSMC Home Page. Open the "Education" pull-down menu, and select "International Acquisition."

ENDNOTES

1. Kwatnoski, Richard, "Secretary Cohen Sets Course for International Acquisition," *Program Manager*, July-August 1997.
2. For a complete description of the previous seminar, see: "DSMC Conducts Successful Ninth International Acquisition/Procurement Seminar with German Federal Academy," *Program Manager*, September-October 1997.
3. Ingénieur Général de l'Armement Jean-Paul Gillybouef is a general officer equivalent rank in the French Acquisition Corps. The Délégation Générale pour l'Armement (DGA) is the French centralized acquisition/procurement agency. The United States has no equivalent organization, as the Military Departments do most of their own acquisition and procurement.

ENJOYING THE SEMINAR. PICTURED FROM LEFT: PETER ROLLER, FEDERAL ACADEMY OF DEFENSE ADMINISTRATION AND MILITARY TECHNOLOGY, GERMANY; NAVY REAR ADM. LENN VINCENT, DSMC COMMANDANT; PROFESSOR TREVOR TAYLOR, CRANFIELD INSTITUTE, UNITED KINGDOM.



ALFRED VOLKMAN, ACTING DEPUTY UNDER SECRETARY FOR INTERNATIONAL & COMMERCIAL PROGRAMS, DELIVERS U.S. NATIONAL PRESENTATION.

DSMC PROFESSOR RICHARD KWATNOSKI INTRODUCES TWO FRENCH SPEAKERS ON THE TOPIC OF INTERNATIONAL PROJECT MANAGEMENT: HERVE JARRY FROM THOMPSON CSF, AND ICA JEAN-BERNARD PENE FROM THE FRENCH ARMAMENTS ACQUISITION AGENCY.



IGA JACQUES PECHAMAT, THE DEPUTY COMMANDANT OF CHEAR AND SEMINAR HOST, INTRODUCES IGA MARC PREVÔT, DIRECTOR OF THE NEW EUROPEAN ARMAMENTS AGENCY, OCCAR.



SEMINAR PARTICIPANTS IN FRONT OF THE SEMINAR SITE, THE HISTORIC ÉCOLE MILITAIRE NEAR THE CENTER OF PARIS.

IGA JEAN-PAUL GILLYBOEUF, DEPUTY DIRECTOR OF THE FRENCH ARMAMENTS ACQUISITION AGENCY, DELIVERS THE KEYNOTE ADDRESS.



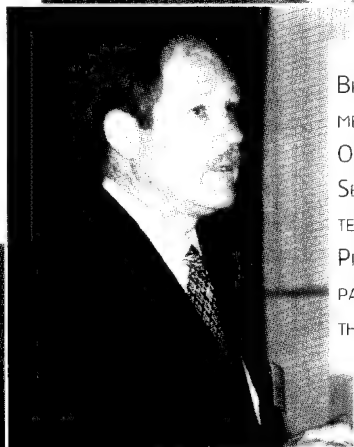
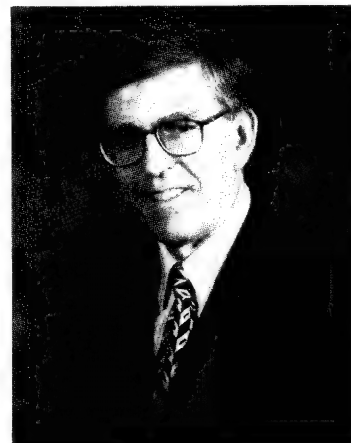
AERIAL VIEW OF THE AUSTRALIAN DEFENCE
FORCE ACADEMY. ADFA File Photo



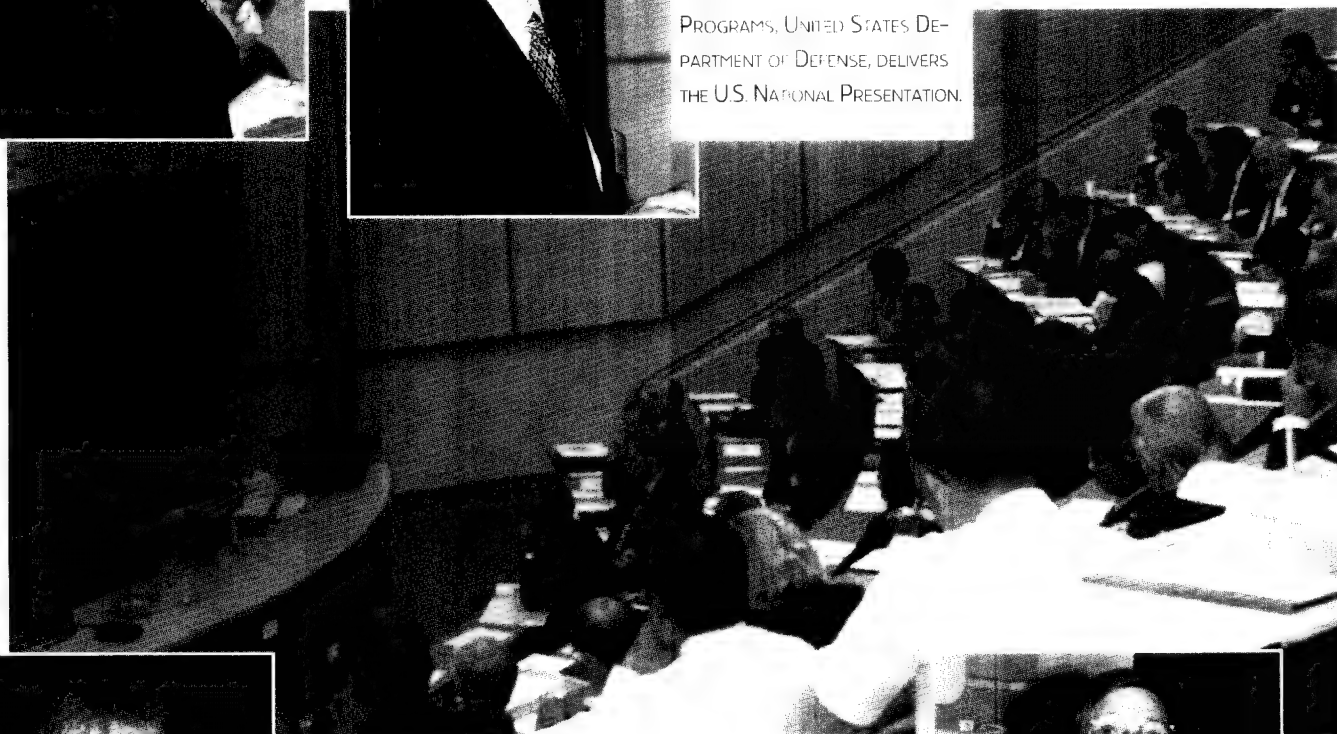
MERRILYN MCPHERSON, FIRST ASSIS-
TANT SECRETARY, CAPITAL EQUIPMENT
PROGRAM, DEFENCE ACQUISITION OR-
GANISATION, DEPARTMENT OF DEFENCE,
AUSTRALIA, DELIVERS THE AUSTRALIAN
NATIONAL PRESENTATION.



GARRY JONES, DEPUTY SECRETARY AC-
QUISITION, DEFENCE ACQUISITION OR-
GANISATION, DEPARTMENT OF DEFENCE,
AUSTRALIA, DELIVERED THE SEMINAR
CLOSING REMARKS.



BRUCE BADER, DIRECTOR ARMA-
MENTS COOPERATION PACIFIC,
OFFICE OF THE DEPUTY ASSISTANT
SECRETARY OF DEFENSE FOR IN-
TERNATIONAL & COMMERCIAL
PROGRAMS, UNITED STATES DE-
PARTMENT OF DEFENSE, DELIVERS
THE U.S. NATIONAL PRESENTATION.



AUSTRALIAN DEFENCE FORCE ACADEMY SEMINAR SITE.

NAVY REAR ADM. LENN
VINCENT, DSMC
COMMANDANT
CONDUCTED A PANEL
SESSION ON ACQUISITION
REFORM DURING THE
SEMINAR.

COMMODORE BRIAN L.
ADAMS, COMMANDANT,
AUSTRALIAN DEFENCE
FORCE ACADEMY, AND
SEMINAR HOST DELIVERS
WELCOMING REMARKS.



The Operations Security Connection

Security Risk Avoidance *Out* – Security Risk Management *In*

ARION N. "PAT" PATTAKOS

"Some elements of the intelligence and defense community have been using the risk management process for many years under the rubric of Operations Security (OPSEC)," notes the Department of Defense/Director of Central Intelligence, Joint Security Commission Report, *Redefining Security*, issued February 28, 1994.

A Paradigm for All Seasons

If you follow U.S. government security issues, clearly DoD's prevailing paradigm actively promotes security risk management techniques to achieve a sensible security posture. In brief, security risk avoidance is *out* (too expensive), and security risk management is *in* (a rational consideration of cost and benefit).

Definitions of risk management abound. One such general definition simply states that it is a method of managing that concentrates on identifying and controlling the areas or events that have a potential of causing unwanted change...it is no more and no less than informed management. Unwanted disclosure of critical information falls well within this definition, due to its high propensity for provoking "unwanted change."

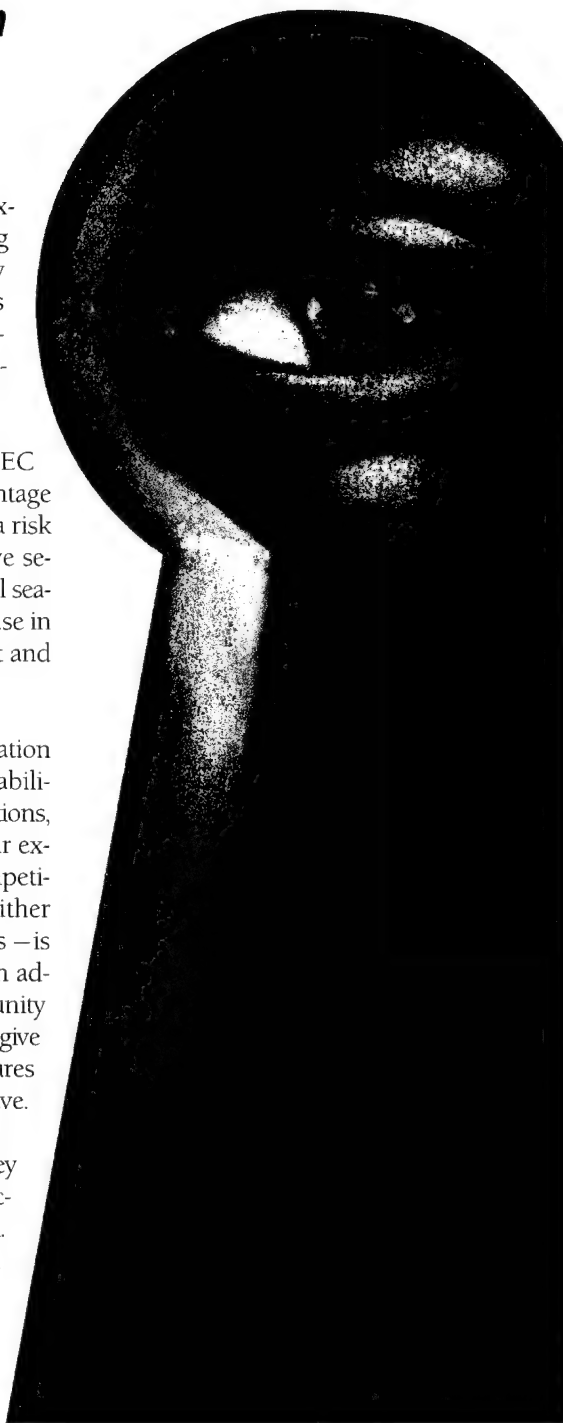
The security community's proposed "new" security risk management paradigm, as advanced at the national level by the Security Policy Board, is promoted

for government-wide use. If you examine the 30+ years of using OPSEC's proven process, it readily becomes apparent that it makes sense in all organizational environments where adversaries or competitors can cause you pain.

Once you understand the OPSEC process, you have a distinct advantage in understanding and promoting a risk management approach for effective security. It literally is a paradigm for all seasons – adaptable and flexible for use in determining what assets to protect and how to protect them.

OPSEC's goal is to control information concerning your operational capabilities, limitations, activities, and intentions, thus preventing or controlling their exploitation by an adversary or competitor. Operational effectiveness – either government or business operations – is inevitably enhanced by denying an adversary or competitor the opportunity to foresee your intentions, and thus, give them the opportunity to take measures to nullify any advantage you may have.

If you apply OPSEC measures, they will maximize your potential for success in any competitive environment. In essence, OPSEC seeks to prevent adversaries/competitors from gaining your critical operational information.



Pattakos is Director of Programs Integration for Beta Analytics International, Inc., and has served in the public and private sectors. A retired Army colonel, his military career included staff positions as Secretary to the Joint Chiefs of Staff, and Deputy Chief of Staff for Operations, U.S. Intelligence and Security Command; as well as command positions with the Army's Intelligence and Threat Analysis Center, the Operational Group, and the 902d Military Intelligence Group. In his present position with BAI (a full-service security firm), he ensures that program managers have the information resources they need to support government and commercial clients. He is an OPSEC Certified Professional (OCP) and a Certified Protection Professional (CPP).

Operational effectiveness
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OPSEC Analytical Process

The OPSEC analytical process focuses on the adversarial exploitation of open or public sources and observable actions to obtain evidence of critical information. These sources are generally Unclassified (not protected as "proprietary information") or are observable activities with no classification. (Proprietary information is the business equivalent of the government system of protecting and safeguarding classified information.) Consequently, such sources of information may be more difficult to control than those that are classified or protected as proprietary.

Since traditional security programs generally protect classified or proprietary information, OPSEC's process focuses on identifying those indicators that contribute to the loss of critical information. It does so by pinpointing those indicators that are not protected, and taking action to deny or control their availability to an adversary or competitor.

Further, OPSEC measures complement other security measures — physical, information, signals, computer, communications, and electronic — to ensure a totally integrated security package. In fact, stepping through the OPSEC process will likely disclose weaknesses in the application of traditional security practices.

How? OPSEC looks at your behavior from an adversary's or competitor's point of view. Information that they need to achieve their goals to your detriment constitutes what you want to protect — the critical information of your operations or activities. To deny this critical information to adversaries/competitors contributes to your own operational effectiveness.

The OPSEC Process

Normally, OPSEC deals with information that, collected in pieces and combined in aggregate form, could reveal sensitive or classified (business proprietary) aspects of an operation or activity. Thus, OPSEC uses a systematic process, designed to determine how ad-

versaries and competitors derive critical information in time for them to exploit that information and use it to your detriment.

The five steps of the OPSEC process are not observed in a rigid sequential order. A recognized strength of this process is its flexibility, thus enabling the OPSEC practitioner to shift back and forth from one step to another, in any order, and any number of times. This flexibility facilitates the effort of achieving operational effectiveness by denying critical information to an adversary.

Practitioners depict OPSEC in different ways. Some depict the steps in the form of a cycle because of their changing, dynamic nature. Another depiction (as shown on p. 38) is three partially overlapping circles denoting critical information, threat, and vulnerabilities. Where all three circles overlap, you have risk and a potential need for countermeasures to mitigate that risk.

As the various elements impacting on your security decrease or increase (for example, the value of information, the seriousness of the threat, and the vulnerabilities a threat might exploit), so must risk decisions change. This Venn Diagram representation is popular with the growing security risk management community.

A discussion of OPSEC's five steps follows:

Identification of Critical Information

This is the information required by an adversary to achieve their goals. A more formal definition of critical information is *specific facts about intentions, capabilities, and activities vitally needed by adversaries or competitors for them to plan and act effectively so as to guarantee failure or unacceptable consequences for your mission accomplishment.*

If you rename this step *Critical Asset(s)*, the five steps of the process can be used in any situation requiring an analytical security risk management approach. Such critical assets might be people, information, equipment, facilities,

activities, or operations. A point to remember is that protecting any asset — from a building to a person — involves some information component, and the protection of this information may be critical to protecting the asset.

In this step, you determine the adverse impact that an undesirable event might have on your asset. In terms of a weapons system, for example, consider this question: May an adversary's exploitation of your information on a weapons system lead to that system's being countered, killed, cloned, or force you into a major redesign?

Analysis of Threats

In this step, adversaries and competitors are identified, including their goals, capabilities, and intentions.

- What do they know?
- When did they know it?
- What do they want?
- Why do they want it?
- How do they go about getting it?

Analysis of Vulnerabilities

This step involves an examination of your total operation or activity, including scrutiny of any vulnerabilities for indicators of critical information that may be exploited by a threat. An adversarial approach is used; that is, we put ourselves in the position of an adversary and study our operations and activities step-by-step, in all phases, from an adversary or competitor's perspective.

Adversary attack scenarios are developed to disclose paths they might use to gather our critical information. We then determine any correlation between our operational actions and an adversary's exploitation capability. Another consideration is how long information may be of value compared to an adversary's ability to collect and exploit the information within that time frame.

Assessment of Risk

In this step, the risk analyst integrates the preceding steps (critical information, threats, vulnerabilities). This is the decision step of the process — at this point decision-makers receive the analysis, to-

gether with recommended countermeasures designed to mitigate the risk.

One outcome of this assessment is a prioritization of risks. Countermeasure costs (in dollar terms, operational impact, etc.) are related to the value of the asset, while benefit is related to the amount of risk reduction the countermeasure offers.

Applications of Appropriate Countermeasures

Countermeasures are actions that deny or reduce the availability of critical information to an adversary or competitor. OPSEC countermeasures may be categorized as: 1) elimination of indicators subject to exploitation; 2) disruption of effective adversary collection or processing efforts; or, 3) prevention of the accurate interpretation of indicators during an adversary's analysis. Thus, the principal impact of a countermeasure is to reduce one or more vulnerabilities.

It should be recognized that the application of some countermeasures might cause another vulnerability. For example, posting guards to protect an activity might focus undesired attention on

that activity. Thus, as part of the OPSEC cycle, prudence requires that you evaluate the effectiveness of your countermeasures the same way you monitor any changes in the value of your assets, the threats to those assets, and the vulnerabilities a threat might exploit.

In the Final Analysis

Security risk management is *everyone's* job. By using the OPSEC analytical process, government executives or business decision makers and managers — *you* — will have a better understanding of what information may be available to an adversary or competitor, the impact of losing that information, and a better understanding of ways to protect valued assets and information. In so doing, you are also selectively applying the "new" security risk management paradigm and, ultimately, contributing to overall organizational effectiveness.

Editor's Note: The 10th Annual National OPSEC Conference and Exhibition will be held March 21-24, 1999, at the Radisson Hotel at Mark Center, Alexandria, Va. Those interested in attending should call (301) 840-6770.

The OPSEC Process



Dr. Gansler Speaks at NATO Workshop

Technology, Future Warfare, Transatlantic Cooperation

After a series of very dramatic and terrifying world events this past year, the collective public attention of the United States and Europe has finally focused on the vast, complex geopolitical, economic, and technological upheaval that is taking place in the world. We no longer need to be reminded that we face a very real – and present – set of new threats from a variety of asymmetric forces capable of being directed against us from all parts of the world.

Recent terrorist bombings in Kenya and Tanzania, the conflicts in Bosnia and Kosovo, the North Korean and Iranian ballistic missile launches, the nuclear explosions in India and Pakistan, the growing proliferation of low-cost cruise missiles, and the sophisticated cyber attacks on the U.S. Department of Defense computer systems have brought home to all of us the very different nature of the present and growing threats to our national security.

While we cannot say for certain how such new threats will evolve, they are unlikely to go away. In fact, as transnational terrorist elements and rogue nations shift to biological and chemical attacks (both at home and abroad) and launch information warfare attacks on our infrastructure (for example, against our air traffic control systems and/or our electronic financial systems), these threats are clearly likely to grow in number and intensity.

Editor's Note: Dr. Gansler spoke at a NATO Workshop held in Norfolk, Va., on Nov. 12, 1998. This information is in the public domain at <http://www.acq.osd.mil/ousda/speech/norfolk nato.html> on the Internet.

"Technology is a potent weapon at our disposal for insuring our collective security...if we learn how to use it wisely, understand its limitations as well as its potential, and, perhaps most important, recognize when not to use it. When used properly, it can make the difference for our future collective security. This is both a challenge and an opportunity."

**—Dr. Jacques S. Gansler
USD(A&T)**

Military Conflict – Dramatic Transformation

Terrorist threats that rely on early 21st century technology are, of course, only one end of the spectrum of future threats we must be prepared to face. We must also prepare for a diverse and unpredictable threat that combines more traditional forms of conflict with acts of terrorism. And, even in these more "traditional" areas, that include everything from small-scale – often urban – military operations on up to nuclear war, military conflict is being dramatically transformed by the rapidly changing nature of modern technology.

For the most part, this is nothing new. Throughout history, advances in technology have directly and indirectly transformed the course of warfare. From spear and longbow, to the invention of gunpowder and dynamite, to the use of aircraft and machine guns, and on to nuclear weapons and ballistic missiles, we have seen how revolutionary advances in weaponry have influenced the nature and extent of combat. Up to this point, however, the primary use of technology has always been to provide advantage to one side's massed forces in its efforts to defeat the other side's massed forces.

All this is about to change. The end of the Cold War, the breakup of the Soviet Empire, the emerging power of rogue nations, the rise of transnational terrorism, and other equally destabilizing geopolitical events, are transforming our vision of 21st century security needs and our NATO military strategy. Two fundamental changes seem clear:

- First, the NATO Alliance will see more short, intense regional conflicts (perhaps followed by extended "peacekeeping" operations).
- And, second, NATO will seek to project power without putting large numbers of its forces at risk. Massed forces will be replaced by massed firepower, precisely placed on targets. Modern, "reconnaissance/strike" warfare, as it is called, is based on real-time, all-weather, accurate and secure surveillance, reconnaissance, intelligence, and communications systems combined with long-range, unmanned, "brilliant," highly lethal weapons designed to achieve precision kills (even on moving targets).

Technology can also enable us to reduce dramatically our response time to unpredictable geopolitical events. The type of regional conflict that we will see more frequently in the 21st century will rarely allow NATO six months to build up forces and deploy them.

There also will no longer be "free" ports or airfields. Aggression will be instantaneous, with little warning, brutal, and difficult to defend against. This is particularly true in the case of aggression by transnationals and international terrorist organizations – because they are willing to sacrifice themselves and their

Official Terms Defense Reform Progress "Remarkable"

JIM GARAMONE

WASHINGTON—DoD will use the experience of the past year to improve efficiencies and savings generated through the Defense Reform Initiative.

Unveiled in November 1997, the initiative allows DoD workers to apply lessons learned in private industry to their jobs, said William Houley, the Secretary's Special Assistant for the Defense Reform Initiative. Reforms are crucial if DoD is to modernize the force, he said, and one is to get Congress to agree to two more rounds of base closures.

The defense budget has flatlined since the early 1990s. While money has been added to offset inflation, DoD's buying power essentially is the same as it was then—when the Services' equipment was new.

"Now our ships, planes, and tanks are old and getting older," Houley, a retired rear admiral, said. "It's like when you have an old car. First, it breaks down more often, and you end up spending \$300 every time you fix your car. Soon you find you are 300-dollared to death." The same thing is happening on a far larger scale with DoD.

"That's why the [Defense Reform Initiative] is important," Houley said. "It is essential we find more money to modernize the force."

The idea behind the initiative is not new. It was preceded by a program that issued defense management reform decisions during the Bush administration. "Everyone agrees on the need for defense reform," Houley said. "Applying it on a consistent, realistic basis is tough."

American companies learned their lessons in the early and mid-1980s, he said. Business shifted to digital management tools, reduced the number of managers, clearly identified their core expertise, and contracted out the rest. "The [differences] between private industry and government grew," Houley said.

Firms that had worked with DoD began saying it was too much trouble doing business with the Department. DoD still worked with paper, had too many decision layers, and its processes just cost too much, he said.

With the initiative, DoD is modeling itself after the best in the civilian sector. Digital procurement? It's a reality at the Defense Logistics Agency. Want less paperwork? Most routine contracts are let via the Internet. Too many people? Offer buyouts and early retirement.

DoD is also working on contracting out many support functions. Houley said contracting out could potentially save DoD billions, but he understands people's reluctance when confronting it. "Change is uncomfortable," he said. "We're talking about people's jobs. Folks roll up their sleeves and do the best job they can, and when you go to ABC depot and say you are going to compete those jobs, it doesn't sound like you're saying [to the work force], 'Thank you very much.'"

Key is reducing infrastructure, Houley said. "Savings we get from [base realignments and closures] would dwarf what we generate from all other [defense reform initiative] programs," he said. "Congress can set whatever rules they want. But we have to reduce infrastructure."

The initiative will go on, and those involved will learn from this first year, Houley said. "We've made some mistakes, but we will learn from those," he said. "More jobs will be competed [for contracting out] this year, and we will keep pushing for [base realignment and closures]."

"We've made remarkable progress this past year," he continued. "We've identified the best programs, and have our most senior people working on them."

Editor's Note: This information is in the public domain at <http://www.defenselink.mil/news> on the Internet.

own civilian populations, as well as hostile civilian populations, to achieve their objectives. In this environment, traditional means of deterrence may not be highly effective.

Multinational Coalition Operations

Our reaction to this new form of aggression must be swift and decisive. The first few days, if not the first few hours, can easily determine the outcome. Our response must come within 24 hours, with sustainability in place in seven days—not in weeks or months. Such responsiveness requires a significant change in doctrine, tactics, organization, equipment, and—particularly—decision making. The NATO Alliance will need to take transformational steps to leverage this change.

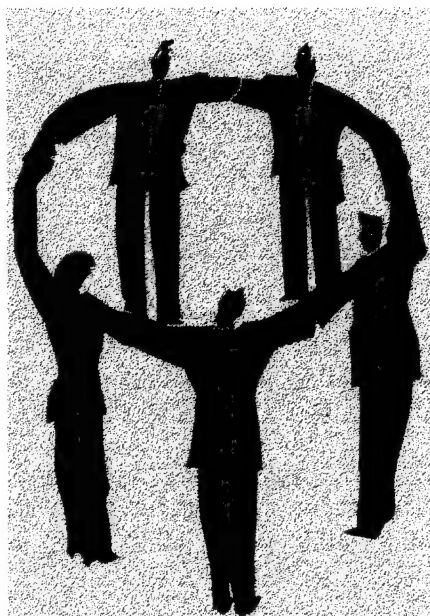
The current and likely future geopolitical situation will most certainly involve increased use of multinational coalition operations. In the new geopolitical environment, each nation's security becomes highly interdependent on the willingness and ability of coalition partners to act in concert when threatened by hostile forces. Technology—when proper coalition planning and implementation are achieved—enables us to act effectively—in fact, synergistically—to achieve the limited objectives we seek.

At a minimum, this means that NATO's systems must be fully interoperable and secure. The rapid global spread of modern information technology makes this possible; but some allied nations are not moving rapidly to take advantage of it; nor, when they do take advantage of it, are they careful to assure its security.

Unfortunately, much of the new technology is also readily available to potential enemies: commercial communications/navigation/earth surveillance satellites, biological/chemical weapons, and low-cost cruise and ballistic missiles. If they can't develop them on their own, they can purchase them—and the skills to use them—on the world arms market.

Importance of Partnering

Therefore, our coalition partners must develop and deploy effective counter-



Interoperability is a major challenge and one of my top priorities as Under Secretary of Defense for Acquisition and Technology. We simply cannot fight effectively as a coalition, within NATO, unless we have fully interoperable equipment and communications—all of which must be secure and dependable.

measures: information warfare defenses; vaccines and special medical agents to counter biological and chemical weapons; defenses against ballistic and cruise missiles; and the ability to destroy hard and deeply buried targets.

To stay ahead of the enemy, we must develop these new defenses as partners. For example: ballistic missile defense—essentially hitting a bullet with a bullet

—poses a particularly difficult challenge; and deploying an integrated NATO theater missile defense system—one that collectively hits all the incoming missiles instead of all of us independently going for the first one coming at us—is an even more demanding technical and management problem. Unless all systems—sensors, weapons, and communications—are fully interoperable, these complex theater missile defense “systems of systems” cannot be effective.

Interoperability is a major challenge and one of my top priorities as Under Secretary of Defense for Acquisition and Technology. We simply cannot fight effectively as a coalition, within NATO, unless we have fully interoperable equipment and communications—all of which must be secure and dependable. The historic objective of multinational armaments cooperation has been to achieve cost reductions. While important, this has become a secondary goal to the military necessity of coalition force interoperability.

Perhaps the most important implication of the rapid global spread of technology is the need for NATO to accelerate its technological advantage on the battlefield in order to stay ahead of our potential enemies. Since, as noted [previously], a terrorist or rogue nation can easily acquire much of the required advanced technology on the world arms market or from readily available commercial sources, our advantage is quickly eroded unless we keep at least two steps ahead of the enemy. This requires not only far greater technology transfer controls—in militarily critical areas—it also requires us to reduce cycle times significantly in the development and procurement of new and modified weapons systems. Current cycle times for major systems run as long as 18 years. We must begin to think in terms of very short cycles (18 months is the norm for current commercial information systems), if we are to continue to outpace our adversaries.

In order to meet the demands for such vastly reduced cycle times, we must be willing to abandon traditional methods

of developing and procuring advanced weapons systems. In addition, something must be done about the cost of our defense systems. Weapons that used to cost in the thousands or hundreds of thousands of dollars now cost millions or tens of millions — some even in the billions. If we are to produce affordable systems quickly, we clearly must pursue non-traditional acquisition approaches; such as maximum use of commercial equipment, as well as significant design process changes, such as:

- Treating unit cost as a military requirement.
- Use of the highly successful “open systems” approach to insertion of new technology into existing weapons systems.
- And (in the production area) use of integrated civil and military commercial assembly lines for defense-unique items. We must take maximum advantage of the potential offered by flexible manufacturing, as well as “lean” design and production techniques.

We must also realize that, for at least the next decade, new weapons systems will not be fully deployed in sufficient quantities to replace most current systems. Thus, we will be fighting, for the most part, with what currently exists. This has already resulted in a serious aging and obsolescence problem. This year, for example, the average age of our military aircraft is 20 years — although many of them were originally designed for a life span of 15 years.

Costs

The costs of operating and supporting these systems are skyrocketing — and their readiness is declining. Therefore, we must divert significant resources to improve the reliability and maintainability of this existing equipment and, at the same time, upgrade performance. Investments in modernization programs, such as digitization of current battlefield equipment, will enable us to do this. But funds for modernization dollars have been hard to come by.

A key source for such funds is from a reduction in the excessive and inefficient

support infrastructure that now exists. Our logistics system, for example, is one area where we can achieve more effective force projection, mobility, and rapid response.

At the present time, more than one-third of the total U.S. Department of Defense budget is earmarked for logistics. Nearly 50 percent of our manpower is in logistics. (In fact, military logistics support personnel outnumber active combat forces by two to one.) Here, as has been clearly demonstrated by world-class commercial logistics organizations, modern technology can come to our aid — dramatically reducing inventory, personnel, and response times.

Typical examples are reductions of order-to-receipt time from 40 days to four days, with far fewer people and significantly smaller inventory. Information technology and rapid transportation, combined with long-range precise weaponry designed to hit targets without deploying large quantities of combat forces or materiel, are the keys to improved logistics performance at much lower costs. However, as the U.S. increasingly operates within coalitions, it is important to note that narrowly focused unilateral logistics performance improvements will not yield the desired benefits in responsiveness and cost savings that are expected. It is therefore important that the Alliance work to adopt a corollary, common logistics system.

Transformation of Defense Industrial Base

Since our future military requirements are likely to be based on short-duration, regional conflicts — using coalition forces operating modern-technology equipment and weapons systems that are fully interoperable, and that are developed, produced, and supported at low cost and on very short cycles — we must significantly transform our defense industrial base to support us in this effort.

To accomplish this goal, the NATO Alliance must adopt a new approach to Transatlantic Armaments Cooperation. This new approach should satisfy NATO's future defense requirements for

each of the participating nations. Depending upon the complexity and production volume of the project, NATO governments would select the approach that maintains competition and shared national responsibilities as far through the procurement process as possible.

NATO and Best Acquisition Practices

This new approach must draw on the best acquisition practices being applied in both the defense and commercial sectors. NATO must take advantage of new approaches, such as Advanced Concept Technology Demonstrations (ACTD), for dramatically reducing development cycle times. NATO must also focus on maximizing the use of commercial technologies and end items, especially in critical areas such as communications and computing, where 18-month product development cycles are common.

The task of harmonizing military requirements, while primarily a government function, must also be addressed by industry because industry is involved in the iterative process by which such requirements are refined and their affordability validated. The demands of coalition warfare and the associated requirement for interoperability of equipment and systems have important implications for each nation's defense within the alliance. Since it would appear that, in the future, there will be very few areas where nations can afford a unique, independent industrial capability, cooperation represents a tremendous opportunity for creating greater efficiency, increased interoperability, and much less duplication.

Global Industrial Linkages

Adopting this new approach will require government and industry to address difficult issues. These include future transatlantic industrial structures and corresponding safeguards for military technology. Here, the U.S. wants to encourage transatlantic (in fact, global) industrial linkages. This requires that we pay increased attention to critical military technology controls (not only in legislation and required procedures, but also in practice).

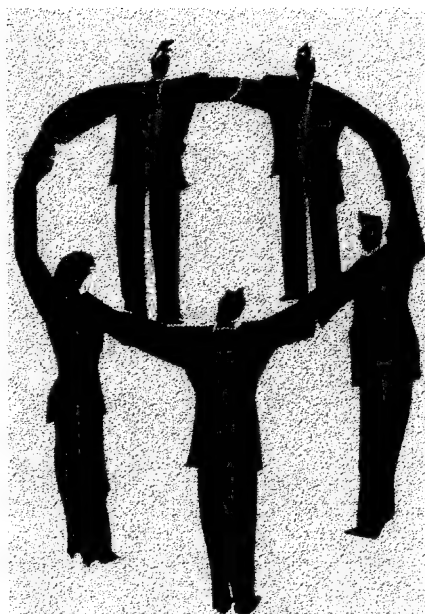
Industry (on both sides of the Atlantic) has been asking us to put out "clarifying guidance" on what added forms of industrial multinational defense mergers would be acceptable. In general, we recognize the need for future coalition warfare and the complementary clear industrial trend of globalization, along with the requirement for greater interoperability of allies' equipment and the potential of international companies to achieve this. However, especially in the cyber age, control of militarily significant technology becomes even more critical — if we are to maintain our military superiority.

Thus, we believe that we must establish new security structures and stronger multinational controls. There will be some countries that have common legal and ethical practices and enforcement. They apply and enforce rigid technology leakage and Third Country sales controls. With these countries, we should be able to relax some of our traditional foreign ownership controls — while, of course, still applying the normal antitrust considerations, as well as the normal security controls for all other potential transatlantic linkages. We are in the process of formalizing some such new "clarifying guidance" with regard to global industrial alliances.

Other issues that need to be addressed include developing an efficient, effective NATO framework that addresses transatlantic industrial cooperation; harmonization of affordable military requirements; security of supply; export control procedures; security of information; efficient use of research and technology funding; controls on ethical behavior, (i.e., bribes), and treatment of technical information and intellectual property rights.

Plan Needed

We must develop a plan to identify ways to overcome current impediments in these areas. Development of this plan should be a collaborative effort between industry and governments. Responsibility for developing this plan should be assigned to a high-level Government and Industry Task Force. The Task Force



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would include a steering group with representatives at the Under Secretary or CEO level and with lower-level working groups assigned to address specific issues and barriers. The agenda and life span of the Task Force would be limited, to avoid formation of yet another standing organization.

I hope that my remarks today on future warfare and transatlantic cooperation

will be useful in your discussions on the future of the NATO alliance in the 21st century. Advanced technology holds great promise in helping us to meet the likely threats of late 20th and early 21st century conflicts. While vital to the success of our future defense strategy, however, it must not be conceived as a *deus ex machina*, capable in and of itself, of assuring victory in combat. Clearly, there is an issue of balance here as we apply new technologies to future 21st century conflicts.

Warfare, as Von Clausewitz has taught us, is, after all, a human enterprise. As such, it is inherently unpredictable. One of the most difficult challenges for modern technology, therefore, is to cope with unpredictable, and non-linear, behavior in modern warfare and with a military culture that is, and will remain, conservative, traditional, and consequently, highly resistant to technology change. Elting Morison pointed this out so brilliantly in *Men, Machines, and Modern Times*.

We must also keep in mind that none of this technology will achieve its desired effect if the combat forces do not know how to use it or when to use it. It must be fully integrated into our alliance military doctrine, tactics, operations, and forces; and the NATO decision-making process must be transformed in order to be able to respond in the reduced time available.

Finally, we deal with geopolitical situations that are often no longer based on conflict between nations and with economic and sociological upheavals that are profoundly unstable and global in scope. Technology is a potent weapon at our disposal for ensuring our collective security under these destabilizing, uncontrollable, and unpredictable circumstances — if we learn how to use it wisely, understand its limitations as well as its potential, and, perhaps most important, recognize when not to use it. When used properly, it can make the difference for our future collective security. This is both a challenge and an opportunity.

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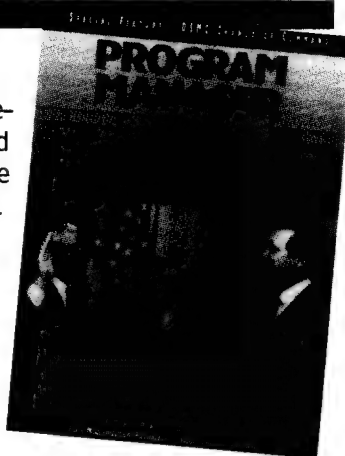
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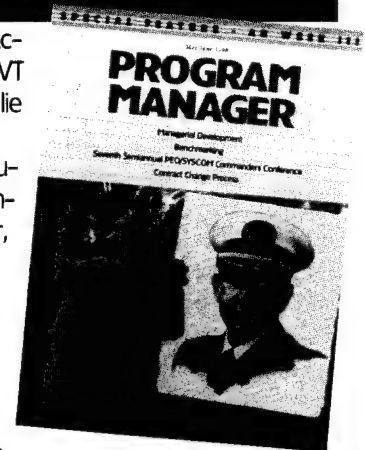
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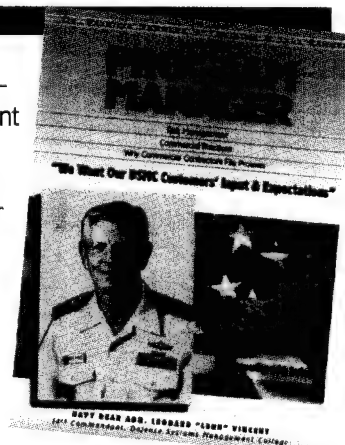


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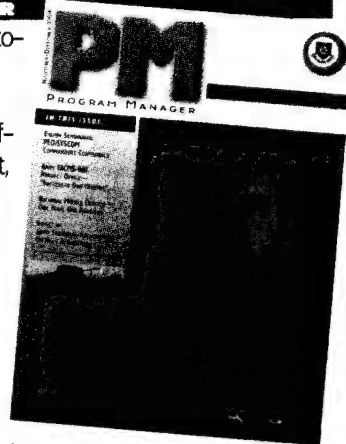
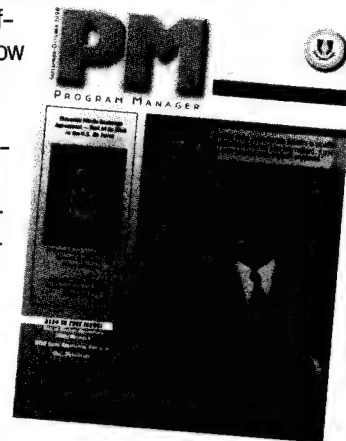
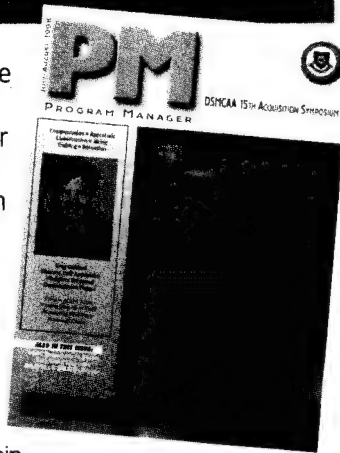
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Air Force Changes Way It Does Space Business

TECH. SGT. TIMOTHY HOFFMAN, U.S. AIR FORCE

PETERSON AIR FORCE BASE, Colo. (AFPN) — The Air Force is in the middle of a fundamental shift in the way it views its role in the nation's space business, said the Acting Secretary of the Air Force after attending the Commercial Space Industry Leaders' Conference here Dec. 10.

"We are transitioning out of being a consumer of launch vehicles," said Whit Peters, Acting Secretary of the Air Force. "In fact, the very theory behind EELV [Evolved Expendable Launch Vehicle] is to buy launch services, rather than buy launch vehicles."

"Lockheed-Martin, Boeing, and the Air Force have each put a billion dollars into EELV. It is flexible and will meet our launch needs."

Peters said space is an industry that is taking off. As the economic benefits of higher commercial production kick in, it will save the Air Force money. "The better Lockheed-Martin and Boeing do commercially, the better off we are because it will reduce our cost of getting to space."

Starting in 1999, the Air Force's Eastern Range at Patrick Air Force Base, Fla., and the Western Range at Vandenberg AFB, Calif., will see more commercial launches than military ones.

"Realistically they are both national ranges now," said Peters. "We are in an era where the ranges serve a very large commercial base."

The key issue, Peters said, is to make sure the Air Force has a robust space force during and after this shift. Air Force Space Command's people will play a critical role in ensuring that happens.

"Whatever we do, first we need to make an assessment of what the space career field is, how many people we need, and make sure we retain the assets we need to have a national defense space team," said Peters. "We are going to do this very carefully, very cautiously, to make sure that we don't screw up the space career field."

The challenge is "trying to sort out how to take what we have, keep the space career field intact, and transition from a 'consumer' to a 'provider' of services," he said.

Currently, both launch ranges provide critical infrastructure, safety, and telemetry for both military and commercial launches.

"We need to make sure those portions of the space business that can be commercialized are commercialized," Peters said. "We also need to look at shifting the safety and regulatory jurisdiction more to the hands of the Federal Aviation Administration where it is vested by law."

State governments are also playing a larger and more important role in space.

"California and Florida are very interested in providing the same kinds of assistance for space launch that they do for many of their other industries," said Peters. This assistance often includes tax incentives and infrastructure support. Alaska, Virginia, and New Mexico also have a strong interest in space, he said.

"These states see commercial launch and commercial space activities as a major economic industry. They are very interested in having a role, and we are very interested in giving them a role."

"From new roads to providing water, gas and sewer, we are very actively involved in shifting from Air Force-owned assets to using state or public service commission services. This is not just happening in Air Force Space Command, but across the Air Force."

Editor's Note: This information, published by the Air Force Space Command News Service, is in the public domain at <http://www.af.mil/news/> on the Internet.

ACQ 201 Equivalency Examination

Under the auspices of the Defense Acquisition Workforce Improvement Act (DAWIA), Defense Systems Management College (DSMC) course directors have administered over 20 Intermediate Systems Acquisition Course (ISAC) equivalency examinations since 1994 to DoD personnel seeking course validation. ISAC, or ACQ 201, is a certified Defense Acquisition University (DAU) Level II course offering, which meets mandatory or desired training requirements for DAWIA certification in six of 11 acquisition career fields. Over 300 members of the acquisition workforce have passed the exam.

In Fiscal Year 1999 (FY99) ACQ 201 will be offered at the main Fort Belvoir, Va., campus as well as our four DSMC Regional Centers. Equivalency examinations consist of two parts and are conducted over a two-day period.

Day 1

On the morning of Day 1, the on-site director fields questions from the examinees. In the afternoon, examinees complete Part I of the examination, consisting of 100 multiple-choice questions. At the end of Day 1, course directors post test scores; those examinees receiving a passing score of 70 percent or more may return on Day 2 for Part II.

Day 2

Beginning on the morning of Day 2, Part II consists of 10 essay questions from a choice of 12 possibilities. Part II will be collected on-site and mailed to the ACQ 201 course director, who will grade the essay portion and award diplomas to those who achieve a 70 percent or above passing score.

Success rates for the examinees are quite high. In FY 98 testing, 75 percent of all examinees achieved a passing score for Part I of the examination, and of those who went on to complete Part II, 80 percent attained a passing score.

Please note that a nominal number of textbooks are available at the DSMC Regional Centers for study and preparation prior to the examination. If you are interested in taking the ACQ 201 equivalency examination, please first contact your agency's on-site training and education coordinator, who will then facilitate your participation in the examination with the appropriate ACQ 201 course director/DSMC Regional Center director.

Should you have any further questions, please contact Air Force Maj. Art Greenlee, FD-AP:

Commercial: (703) 805-4987

DSN: 655-4987

E-mail: greenlee_arthur@dsmc.dsm.mil

ACQ 201 EQUIVALENCY EXAMINATION SCHEDULE FOR FY 99

Date	Location	Organization/Region
February 23-34	Hanscom AFB, Mass.	Eastern Region Comm: (781) 377-3593 DSN: 478-3593
March 30-31	Fort Belvoir, Va.	DSMC Main Campus Comm: (703) 805-4987 DSN: 655-4987
April 13-14	Redstone Arsenal, Ala.	DSMC Southern Region Comm: (256) 842-9045 DSN: 788-9045
June 15-16	Los Angeles AFB, Calif.	DSMC Western Region Comm: (310) 363-8716 DSN: 833-8716

Small Business Gains Certification, International Recognition Through DoD Mentor-Protégé Program

**Army Col. Kenneth Dobeck
Guides DoD-Industry Partnership**

RALPH STODDARD

The Department of Defense (DoD) Pilot Mentor-Protégé Program (MPP) is a unique effort that seeks to encourage major DoD prime contractors (mentors) to develop the technical and business capabilities of Small and Disadvantaged Businesses (SDB) and other eligible protégés. Originally conceived to develop a company or business's technical capabilities, MPP enables the protégé to expand their business base within the DoD marketplace.

Through credit toward subcontracting goals or some direct reimbursement of costs, the MPP provides incentives for these mentors to establish and implement a developmental assistance plan that enables the protégé to compete more successfully for DoD prime contracts and subcontract awards. Naturally, the firms represented in the MPP encompass a broad range of companies and contractors throughout the entire U.S. defense industry. DoD, however, makes no guarantees that subcontracts will result from participation in the program.

Army Col. Kenneth Dobeck, the U.S. Army Medium Tactical Vehicles (MTV) Project Manager, supported by a team from the Program Executive Office, Ground Combat and Support Systems, and the U.S. Army Tank-automotive and Armaments Command (TACOM), recently helped Electro National Corporation (ENC), a small, minority-owned



TVS 5-TON VEHICLE

manufacturer of electromechanical products, achieve certification to ISO 9002 standards. (ISO 9002 is an international quality standard recognized by all major industries located around the world.)

This article is the story of that partnership, which succeeded well beyond their initial expectations, and a company that gained international recognition as a result of their combined efforts.

A Little Help Goes a Long Way

In achieving ISO 9002 certification, ENC had help and support from three sources: DoD, which sponsors the MPP; the U.S. Army Project Manager for Medium Tactical Vehicles, supported by TACOM, who initiated the contract effort in Au-

gust 1995; and Tactical Vehicle Systems (TVS), a division of Stewart & Stevenson Services, Inc., in Sealy, Texas, who served as the mentor assisting its protégé (ENC). TVS, as the U.S. Army's prime contractor for the manufacture of the Family of Medium Tactical Vehicles (FMTV), was the logical choice to lead and guide ENC through the program.

In addition to assisting ENC with ISO certification, TVS (the mentor) guided ENC's efforts to achieve several other significant milestones. Among these milestones is the successful development of a start-up welding facility and certification of weldments to American Welding Society (AWS) standards D1.1 (steel) and D1.2 (aluminum). Contract awards

Stoddard is the Mentor-Protégé Program Manager, in the Tactical Vehicle Systems Division of Stewart & Stevenson Services, Inc., Sealy, Texas.

also include fire extinguisher brackets and cable and wiring harness assemblies for the FMTV and its variants.

As a result of these achievements, ENC bid on and won over \$4.2 million in manufacturing business, with an additional projected revenue of \$10 million.

Further, ENC has shown superior ability as a subcontractor to TVS and has been extremely successful with the development and production of two other components: the Troop Transport Alarm System and the Machine Gun Mount Platform Kit for the FMTV.

Troop Transport Alarm System

The development of the Troop Transport Alarm System was in response to a critical safety need expressed by TACOM. Due to safety concerns, TACOM required installation of this alarm on all FMTV vehicles that are capable of transporting troops. This project was critical to the U.S. Army; ENC responded to that critical need and successfully developed the Troop Transport Alarm System — a significant milestone in its development as a major DoD subcontractor.

Machine Gun Mount Platform Kit

ENC's production of the Machine Gun Mount Platform Kit was the result of winning a competitive bid offering by TVS. Platform kits were essential to the U.S. effort in Bosnia; thus, quantity and ship dates were extremely critical. ENC responded to this challenge by certifying welders and weldments, fabricating jigs and fixtures, proofing its processes, and shipping a quality product on time to reach the U.S. field troops for deployment in Bosnia.

As an added bonus, by responding to this challenge, ENC successfully completed a major mission of the Mentor-Protégé Program — welding certification.

Recent Successes

As further validation of ENC's increased competitiveness, ENC enjoyed its most recent successful bid when Israel Aircraft Industries, Ltd., awarded them a contract for current production. This contract, which involves building heli-



copter crashworthy troop seats for application on the U.S. Navy CH53 helicopter, has immense revenue potential for ENC over the next 10 years.

ENC's unqualified success in the Mentor-Protégé Program earned them a nomination for the prestigious Nunn-Perry Award for outstanding performance. Also, ENC emerged as a strong competitor in the national and international marketplace, and increased its value as a potential prime contractor for the DoD.

Currently, the Department of the Army Small and Disadvantaged Business Utilization Office (SADBU) has approved a request by Dobeck for a new TVS/ENC Mentor-Protégé Agreement. Under the new agreement, ENC targeted four new missions: certification to ISO 9001, D1 9000, and QS 9000; implementation of advanced welding technology; vertical integration to metal fabrication; and the execution of domestic and worldwide marketing plan.

ISO 9001, QS 9000, and D1 9000

The first mission encompasses the development of an ISO 9000 Series International Quality System; ISO 9001 — "Quality Systems — Model for Quality Assurance in Design, Development, Production, Installation, and Servicing," an associated QS 9000 Series Automotive Industry Quality System; and D1 9000 quality system tailored for the aircraft and aerospace industry.

Implementation of Advanced Welding Technology

As a second mission, TACOM and TVS will be assisting ENC in its development of advanced welding technology, including appropriate training programs.

Metal Fabrication

The third mission adds the development of metal fabrication capabilities to ENC's product line. Vertical integration to metal fabrication will assure that ENC will have the capability to develop and manufacture fabricated products. Once these fabricated products are manufactured to meet DoD standards and specifications as well as commercial requirements, ENC will become a qualified supplier of these products.

Program Management and Marketing

The fourth and final mission is program management and marketing. This is a continuation of management and marketing efforts that are:

- Mentor-Protégé program management issues as well as issues that relate to general program planning and business management.
- Organizational, financial, personnel management, marketing, business development, sales, and business trend analysis issues.

ENC collaborated with TVS to exhibit its products at Association of the U.S. Army (AUSA) Exhibits in 1995, 1996, and 1997; and participated in the Mentor-Protégé Conference in November 1997. Other trade shows and conferences in which ENC participated include National Design Engineering, National Plant Engineering and Management, Na-

COL. KENNETH R. DOBECK, U.S. ARMY

*Project Manager, Family of Medium Tactical Vehicles
Tank-automotive & Armaments Command
Warren, Michigan*

Army Col. Kenneth R. Dobeck is the Project Manager for the Family of Medium Tactical Vehicles, at the Tank-automotive & Armaments Command. Dobeck entered the Army as a second lieutenant in the Ordnance Corps after graduation from Norwich University with a B.S. in Mechanical Engineering. He is a graduate of Purdue University with an M.S. in Engineering Science, and also holds an M.S. in National Resource Strategies from the National Defense University.



His military education includes the Ordnance Basic Course; Engineer Advanced Course; Mapping, Charting and Geodesy Officer Course; and the Armed Forces Staff College.

Following completion of the Engineer Advanced Course, he served as Battalion Maintenance Officer and Company Commander, B Company, 547th Engineering Battalion, Darmstadt, Germany. Returning to the continental United States, he was assigned as Program Manager for the Engineer Topographic Laboratory, Fort Belvoir, Va., and as Program Manager for Defense Mapping Agency, Washington, D.C. Dobeck was assigned as Action Officer and Congressional Liaison for Special Access Programs, Office of the Secretary of Army for Research and Development (Special Operations); followed by an assignment as Product Manager for the heavy Assault Bridge, Tank-automotive & Armaments Command, Warren, Michigan.

Awards and decorations include the Meritorious Service Medal with three Oak Leaf Clusters and the Defense Meritorious Service Medal.

tional Industrial Enterprise IT, and National Industrial Automation.

TACOM and TVS Technical Assistance to ENC

TACOM and TVS continue to provide ENC ongoing technical assistance in production, manufacturing, industrial, electrical, mechanical and quality assurance engineering. This also includes technical assistance to develop future

designs of electronic sensors and switches, electronic devices, and products ENC is currently producing.

TVS is continuing to offer ENC ongoing assistance with reviews of government and commercial requests for quotations/proposals and purchase orders, as well as assisting in proposal writing, bidding processes, and debriefings.

They've Come a Long Way

All of these efforts are designed to enhance ENC's capabilities and will permit ENC to perform successfully under prime contracts or subcontracts with DoD, federal agencies, and other commercial contracts ENC may be involved in as a result of the Mentor-Protégé Program.

"Certification of ENC's design capabilities is the next step identified in the new TVS/ENC Agreement under the Mentor-Protégé Program," says Ralph Stoddard, Mentor-Protégé Program Manager for TVS.

"From there, ENC must also develop specialized welding capabilities—for example, new techniques for welding galvanized steel that will help the Army overcome critical corrosion issues. In doing so, ENC will help extend the life cycle of these military vehicles and ultimately save the taxpayers' money."

Michael Trigleth, President and General Manager of ENC, speaks of the importance of the Mentor-Protégé Program to ENC's competitiveness throughout the defense industry. He explains that due to DoD spending cutbacks over the last decade, ENC was put at a disadvantage, and financially unable to pursue new business.

"ENC was hovering on the brink of closure and needed TVS' and Department of the Army's assistance to be a viable contender in the national and international marketplace," says Trigleth.

"Both TVS and the Department of the Army recognized that technical assistance, as well as transference of technology by TVS was necessary for ENC to survive as a company. Our vision for the future at ENC required developmental programs, such as the Mentor-Protégé Program, that could assist us in achieving our objectives and goals relevant to survival now, into, and throughout the 21st century."

The new TVS/ENC Agreement under the Mentor-Protégé Program, according to Trigleth, went into effect Sept. 30, 1998.

The National Missile Defense System

Affordable Acquisition Strategy and Industrial Capabilities

EDDIE JAPZON • DR. KRIS SWAMINATHA
MICHAEL MOFFITT

Today's National Missile Defense (NMD) Program evolved from "Star Wars" in the 1980s. Unlike the "Star Wars" global protection vision, the NMD Program approach to missile defense is to provide an initial capability to protect against a limited ballistic missile threat, with the ability to evolve to a more advanced capability to counter future threats. In an April 1996 memorandum, the Secretary of Defense designated the NMD Program an Acquisition Category (ACAT) ID program, transitioning the previous technology readiness program to a deployment readiness program.

"3+3" Program — Acquisition Strategy

The Ballistic Missile Defense Organization (BMDO) formulated the "3+3" program for National Missile Defense (NMD) — to develop, test, and demonstrate a capability in three years that can be produced and deployed in an additional three years. At the end of the first three years, a decision will be made based on the perceived threat at that time, either to deploy the system or to continue development to meet the demand of a more complex threat.

To increase the likelihood of program success, our NMD Joint Program Office (JPO) implemented "3+3" using the practices, processes, and procedures embodied in DoD's Acquisition Reform initiatives.

First, to control program costs and assure an affordable system, we mandated

the use of commercial-off-the-shelf and non-developmental items where feasible; and an Open Systems Architecture approach to system design to minimize life-cycle costs and permit easy insertion of new technology without system redesign.

We also adopted the integrated product team (IPT) concept, forming diverse IPTs to deal with program problems and issues expeditiously, thus avoiding further delays.

Spotting Potential Problems

Current trends in industrial capabilities, resulting from cuts in defense spending, have impacted many major weapon sys-

tem programs. To avoid similar problems, we conducted an assessment early in the program's development phase, to identify potential problems that may impact future production and deployment. The importance of this assessment is underscored by the program manager's decision to include the assessment in the Defense Acquisition Board (DAB) requirement.

NMD Program

The NMD Program is unlike any other Major Defense Acquisition Program (MDAP) in two respects. First, the acquisition activities in most MDAPs — development, production, and deployment — average 12 to 16 years. In contrast, the

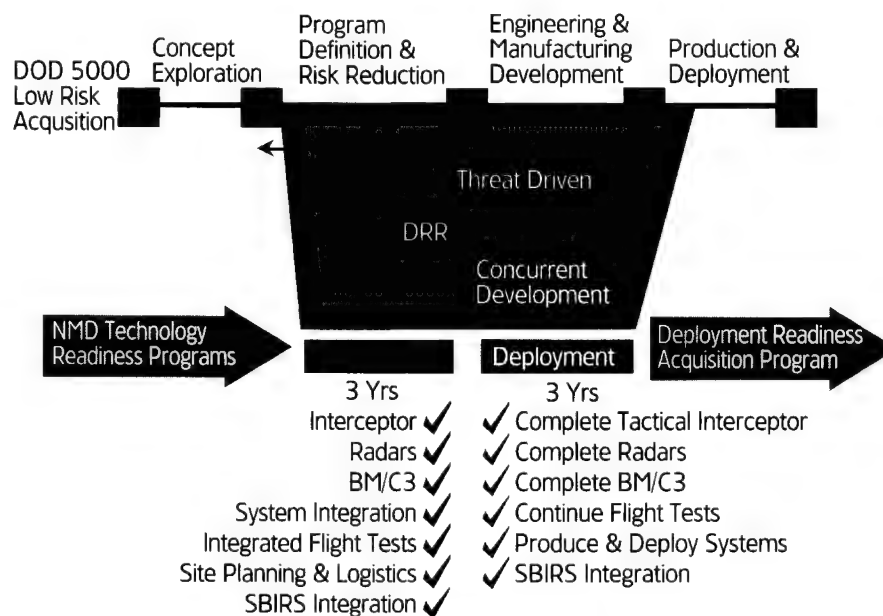


FIGURE 1. "3+3" Streamlined Acquisition

Japzon is an Industrial Engineer in the National Missile Defense Joint Program Office. Swaminatha holds a Ph.D. in Economics and is employed by Raytheon Systems Company. Moffitt is a Senior Engineer with the Science Applications International Corporation.

NMD Program is a "3+3" streamlined acquisition program, as illustrated in Figure 1.

Second, the system design is constantly evolving to keep pace with a changing threat. NMD has adopted a "Plug and Defend" strategy for design flexibility. This approach involves development of a set of elements – radar, interceptors, and battle management command and control communications – termed the NMD "Element Toolbox."

NMD System Architecture

The NMD "Element Toolbox" (Figure 2) is composed of several elements that are required to perform unique functions in a ballistic missile defense engagement. The ground-based interceptor (GBI) is the weapon element that engages and destroys the threat. The ground-based sensors, X-band radar (XBR) and upgraded early warning radar (UEWR); the space-based sensors, Defense Support Program (DSP); and Space-Based Infrared System (SBIRS) provide the dual-sensor phenomenology required to address the full spectrum of potential threats. Providing human-in-control communications between all these elements is the Battle Management Command, Control and Communications (BMC3).

The NMD architecture roadmap provides for an initial capability, C1, to combat a simple threat. The C1 capability includes a limited quantity of GBIs; XBRs; UEWRs consisting of Ballistic Missile Early Warning Radar (BMEW) upgrades, COBRA DANE, and a new X-band radar; SBIRS using the fielded DSP; and a BMC3 element. The BMC3 interfaces with the National Command Authorities and Other External Systems/Centers for command coordination, threat validation, and information interchange.

The C2 capability will be an extension of the C1 capability to combat a more complex threat. It will require an increase in the number of GBIs and XBRs, and will depend more heavily on the space-based systems. The C3 capability will be a more advanced

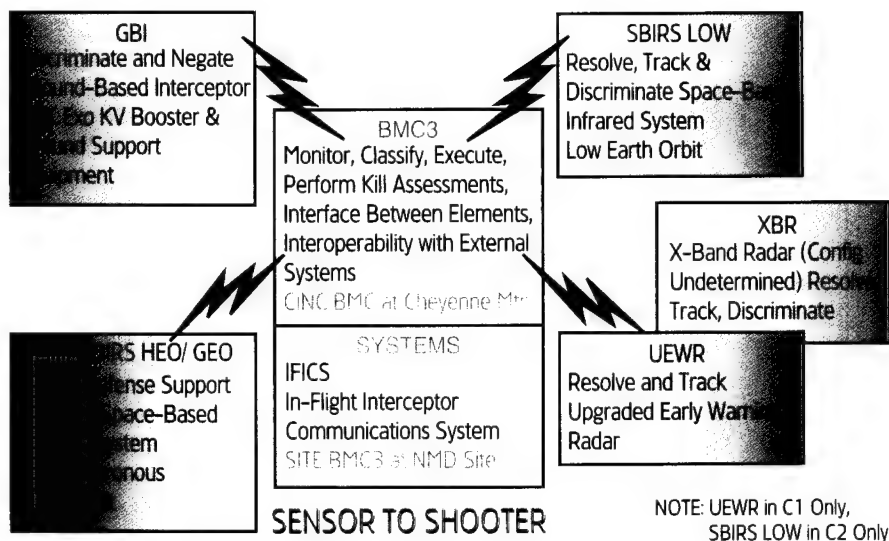


FIGURE 2 NMD System Elements

system with greater performance parameters to handle threats that are increasingly more complex.

NMD Industrial Capabilities Assessment

The Producibility and Manufacturing Working Group, a subgroup of the Deployment Readiness IPT, performed the industrial capabilities assessment. All relevant players, working in partnership – the NMD JPO, the Element Program Offices, users, contractors, and Office of the Deputy Under Secretary of Defense (Industrial Affairs and Installations) Directorate of Industrial Capabilities and Assessments – made up the Working Group membership.

Since we conducted the assessment early in the development phase, this initial assessment concentrated on the key technologies, and components and vendors that may impact the system development. The Industrial Capabilities Assessment is a living document and will be updated as the program transitions to production and deployment.

In the absence of viable data specifically for the NMD Program, we based the Industrial Capabilities Assessment on information obtained from visits to the development contractors' facilities, and a literature review of over 40 related defense industry sector studies.

As part of our assessment, we also evaluated the health of a given vendor or sector in terms of several broad business factors: commercial and military sales trends; the financial standing of the producers; and the ability of the production base to support future sustainment needs. Additionally, the criticality of a component and/or subcontractor/vendor was based on the criteria established by DoD: *sole source, single source, offshore source, long-lead-time item, sustainment capability, and technology maturity*.¹

Major Trends in The Industrial Base

Significant changes in U.S. industrial capabilities have emerged in the post-Cold War era. A rapid shrinking defense industrial capability, diminishing manufacturing sources (DMS), and increased foreign dependency for high-tech products and technologies have resulted from cuts in defense spending in recent years. How and to what extent these changes will impact element production was the focus of the Industrial Capabilities Assessment.

Shrinking Industrial Capabilities

A review of several defense industrial sector studies showed a substantial decrease in the number of sub-tier vendors supporting the defense industry due to defense budget cuts. This is especially true for aerospace and electronics industries, the primary industries involved

in the NMD Program. The aerospace industry is facing serious challenges from continuing cuts in defense spending, a weak global demand, and increasing international competition. In the last 10 years, cuts in the real defense budget for aerospace products, both in the United States and in other developed countries, have reduced purchases for military aircraft, missiles, and related equipment from U.S. suppliers.

A similar trend in the defense electronics industry has occurred. In 1990, 25 defense electronics companies competed for DoD contracts. If the Lockheed Martin-Northrop Grumman merger were to occur, it would leave only two companies—Lockheed-Martin and Raytheon—dominating defense electronics. This is of particular interest to the NMD Program because of the inordinate number of electronic components in the system. The procurement budgets in 1997 were 66 percent for missile components and 54 percent for space systems components.

Continued consolidation—specifically in the rocket motor, thermal battery, electronic, sensor, and communication equipment industry—are of concern to the NMD program and may impact the ability to produce and deploy the system. Several components were identified that have been affected by consolidation; as a result, these affected components are limited to a single or sole-source producer: cryogenic devices, beryllium metal oxides, Novoltex composite material, application-specific integrated circuits (ASIC), high-power amplifiers, transmit and receive (T/R) modules, radiation-hardened electronic parts (e.g., clocks, memory parts, power supply circuits, focal plane array).

Diminishing Manufacturing Sources (DMS)

Diminishing Manufacturing Sources (DMS) is a situation caused by the shrinking U.S. industry and the rapid advances in technology. This problem is particularly prevalent in aerospace and electronics industries.²

The aerospace industry is expected to face continued consolidation between

now and 2005. Prime contractors will seek to enhance their competitiveness for a dwindling defense budget by applying downward streamlining pressures on the supplier chain. This increased competitiveness, coupled with the excess capacity within many defense industry segments—including aircraft, missile systems, and electronics—is expected to result in downsizing of the number of suppliers.

The NMD system, with its requirements for a range of sophisticated interceptors, sensors, and communication equipment, could be susceptible to the endemic DMS situation. The impact however, may be significantly reduced by the Open Systems Architecture approach in the system design we have adopted. This approach will also reduce life-cycle cost by facilitating upgrades using incremental technology insertion, rather than by system redesign.

Foreign Dependency

Recent experience with other advanced strategic and tactical missiles indicates that foreign sourcing is pervasive in the electronics arena. In fact, Department of Defense encourages the use of foreign sources to obtain a wider competitive cost and technology base, as long as foreign sourcing does not place the United States in the strategically vulnerable position of being unable to obtain electronic components, when needed. Reliable “foreign sources and international cooperative developments shall be used where advantageous and within the limitations of the law.”³

Ultimately, the risk of foreign sources has to be weighed against the cost of buying components and systems domestically. The issue is vulnerability, not foreign dependency: As long as there are multiple sources in multiple countries, there is neither military nor economic vulnerability.

Previous studies have shown that although U.S. offshore dependency for missile systems is somewhat low at the immediate first-tier level, it increases dramatically as one investigates the lower second-tier subcontractor level.⁴

Major imported components and processes for advanced missiles use technologies similar to those used for NMD system elements, including ceramic packages, silicon base wafers, socket contacts, transistors, and ball screws. Similarly, important imported *manufacturing equipment* consists of milling and turning equipment, machine centers, bonders, dicing saws, and CNC lathes.

Uncertainty notwithstanding, we remain committed to “3+3.” In spite of the recent trends, our assessment showed the industrial base is capable of producing the NMD elements with the current production capacity for the development phase. Future requirements are also viewed as viable, assuming the industrial capabilities remain stable over the next few years.

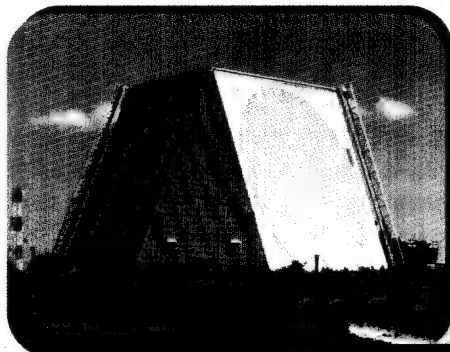
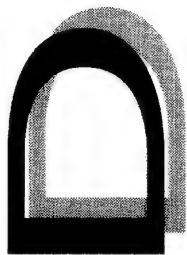
The NMD JPO is committed to the “3+3” program in spite of the obvious high risk of the streamlined acquisition program. The year 2000 is the first opportunity to decide to deploy the NMD System or continue development based on the demonstrated capability of the system and the threat at the time. With this in mind, we are using an aggressive proactive management approach to reduce the program risk and prepare for the production and deployment of the system if the decision is made to deploy.

ENDNOTES

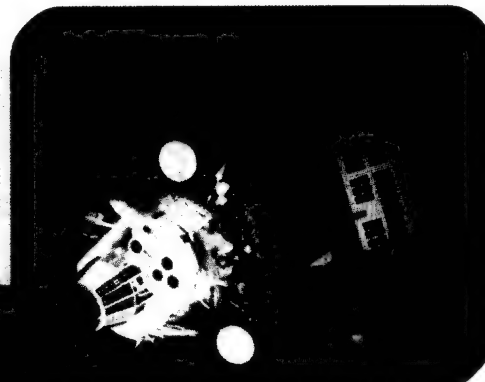
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2. Electronic Industries Association, *Ten-Year Forecast Conference of Defense, NASA and Related Electronic Opportunities (FY 1998-2002)*, October, 1997, pp. 131-132.
3. Defense Federal Acquisition Regulation Supplement, Part 225, *Foreign Acquisition*.
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The National Missile Defense Program

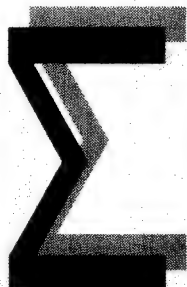
Advanced Capabilities to Counter Future Threats



UPGRADED EARLY WARNING
RADAR (UEWR)



DEFENSE SUPPORT PROGRAM/ SPACE BASED
INFARED GEOSYNCHRONOUS AND HIGH
ELLIPTICAL EARTH ORBIT SATELLITE
(DSP/SBIRS GEO)



SPACE BASED INFARED SYSTEM
LOW EARTH ORBIT (LEO)
(SPACE AND MISSILE TRACKING SYSTEM)



GROUND BASED I
NTERCEPTOR IN FLIGHT
INF1 TARGET LAUNCH
JUNE 24, 1997



BATTLE/MANAGEMENT/COMMAND, CONTROL
AND COMMUNICATIONS (BM/C³) CENTER



KILL VEHICLE ON LAUNCH SITE WITH
PAYLOAD SHROUD ON THE GROUND
BASED INTERCEPTOR (GBI)

ELEVEN INDUSTRY STUDENTS GRADUATE FROM APMC 98-3

Margaret B. Renton, The Boeing Company, presents a plaque to DSMC Commandant, Navy Rear Adm. Lenn Vincent inscribed with the name, state, and company of each of the 11 industry graduates of DSMC's Advanced Program Management Course (APMC 98-3). Renton presented the plaque at the APMC Graduation Dinner, held at the Radisson Plaza Hotel, Alexandria, Va., Dec. 16, 1998.

Photo by Richard Mattox



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Eight Time-Proven Presentation Tips

Violate at Your Own Risk

DANIEL KNAPP

"I know this is an eye chart so I will just run through it quickly." Eddie realized he repeated those words for at least the second time. The audience stirred restlessly. Some appeared to doze or look ahead in the stack of inch-deep slides; one nodded into slumber. Eddie squinted at the overhead projection with its small print. He couldn't read it from five feet away. Eddie fought to save his project funding but lost his audience to a mental holiday. Eddie also lost his funding.

Losing Your Message

Did you attend this presentation? We all did. It's a long-running series of presentations given daily to audiences who influence our programs. This type of presentation is common in the world of military technical presentations. Unfortunately, the presenter loses an important message in poorly presented and irrelevant detail.

This article suggests eight tips for organizing and delivering a technically oriented presentation to a non-technical audience. Apply these tips and you will retain the audience; maybe you'll even convince them to your way of thinking. Violate even one of these tips and, at best, you look no better than your competition.

Remember, our presentations reflect our attitudes as well as the delivered information. If we assume full responsibility for completion of an information ex-

change, we become effective presenters. When we cover as much information, in as detailed a manner as possible given the time constraints, we have a communications problem.

Effectively presenting information to an audience will positively influence our professional reputation more than any other skill we possess.

Now, read that line again.

Audience Expectations

Few people have any idea specifically what you do on a daily basis or how well you do it. When you stand to present information, your entire professional reputation stands with you. A poor presentation not only reflects on our information but even more, on us.

Audiences today expect high-quality presentations. They expect us to know our message, deliver it with some proficiency, and clearly state our needs. At the same time, "just let the facts speak for themselves" doesn't work. Audiences bore quickly, retain little, and confuse easily. That last sentence may exaggerate reality, but if you treat it as reality you will not go far from wrong. Audiences expect us to complete the data connections and draw conclusions for them.

Presenters who deliver ideas with showmanship have a better chance for conveying their messages, and making themselves memorable. Audiences are people. They prefer working with people they like. If you employ some showmanship and make your presentation viewer-friendly, the audience will better accept you and your ideas. We invest our precious time preparing presentations; we expect them to work for us. Let's give them every chance.

Audience Manipulation

Does this approach to presentations sound like audience manipulation? The answer depends on your viewpoint. I prefer the term preparation. When you have a major presentation, don't you take care to look your best? Would you give your big presentation wearing jeans and tennis shoes? No? Then why allow the presentation to wear casual clothes? Shine your presentation and your shoes. Both matter.

Tip 1.

Know the audience and objective.

No matter how simple or complex the issue, you are presenting a managerial overview. What is the purpose of this presentation? Are you asking for a decision? Are you promoting a new idea? Are you updating management on program status? Are you protecting or searching for financial support? What specific action do you want from the audience as a result of your presentation?

Do you know your issue well enough to express it in one sentence of 15-20 words? Five to ten words would be better. (Example: Extending the EMD [Engineering and Manufacturing Development Phase] two years will add an additional 8 percent to the R&D [Research and Development] funding requirement.)

Never present information until you can phrase your issue succinctly. Address the specific purpose of the presentation and nothing else. If we expand the presentation beyond the specific objective, we may cause confusion or solicit irrelevant questions where our purpose suffers.

Once we understand the specific result we want from the presentation, we tailor our information to support the objective.

Knapp is a Project Director for M1A1 Conduct of Fire Trainer Rehost at U.S. Army Simulation, Training, and Instrumentation Command, Orlando, Fla., and holds an M.B.A. from Roosevelt University. He is an Advanced Toastmaster (Gold) and a member of the National Speakers Association.

We cannot “trot out” the standard canned presentation and expect it to fit any audience.

Tip 2.

What's the point?

We make a specific point in every presentation. If we have more than three main points, a verbal presentation is the wrong way to present them. The audience cannot long stay with us in a verbal presentation. Any verbal presentation of an hour or less is really a management presentation. Treat your presentation as a managerial presentation. This means focus on communication of an idea or concept rather than teaching a technical subject.

From your audience's point of view, they will only want to know what's in it for them. The technical approach to how you implement your idea is nowhere near as significant to your audience as what the idea will do for them once implemented.

Tip 3.

Keep the presentation short, and focus only on the specific objective.

I can't think of any presenter who disappointed the audience by giving a shorter-than-anticipated presentation. We want to use all the time allotted and more if we can get it; but this is not effective on the audience. If we can follow the old adage to “stand up, speak up, shut up, sit down,” the audience will appreciate the message and us.

Tip 4.

Make the slides “viewer-friendly.”

Make the old rule of thumb — no more than seven lines/no more than seven words — your style. The day of a black and white, text-laden overhead is over — if it ever existed at all. Use color slides. Check how the colors work together at varying distance. Do your col-

ors have enough distinction so that the audience realizes you have different colors? Black, dark blue, dark red, and dark green look about the same from 20 feet.

Use good clip-art.

Some presenters hesitate to use clip-art as

they feel it may not look professional. Quite the contrary — do not project your fears into the audience. The “important” audience consists of real live people. They have the same characteristics as any other people. Good clip-art adds interest to the visual.

The audience will pay more attention looking to see how you will apply clips on later visuals. The rule is use some clips, but not a lot. Any edge helps. (To find additional slide preparation and styling tips, visit <http://www.presentersuniversity.com> on the Internet.)

Tip 5.

Use a handout.

I am not referring to the hard copy of your slides. I am referring to that technical information Eddie used to clutter his slide.

Most technical data looks cluttered on slides. If you must show detailed technical data, take the time to prepare a separate handout where tables, diagrams, and lengthy text can work to your advantage. You don't have time to adequately explain intricate technical details — why present them at all?

Tip 6.

Use a computer (carefully) to present slides.

Computer presentations make the slide colors more vivid versus using overhead projectors. You look better prepared. You look professional.

When using the computer to present slides, resist the temptation to employ every presentation trick the computer supports. Some animation and video



Tip 1:
Know the audience
& objective.

Tip 2:
What's the point?

Tip 3:
Keep the presentation
short, and focus on
the specific objective.

Tip 4:
Make the slides
“viewer-friendly.”

Tip 5:
Use a handout.

Tip 6:
Use a computer
(carefully)
to present slides.

Tip 7:
Tell your story.

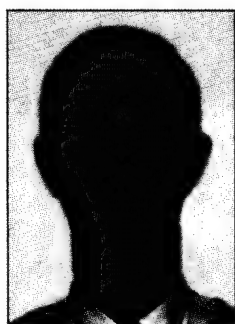
Tip 8:
Practice.

**Apply these tips and
you will retain
the audience; maybe
you'll even convince
them to your way of
thinking. Violate even
one of these tips and, at
best, you look no better
than your competition.**

can make the presentation memorable. A lot of animation and video becomes tedious. The presentation information is important; how a picture materializes is not important. You are trying to achieve a presentation objective. Unless you want to look like a nerd, don't get cute.

Tip 7. Tell your story.

As a presenter, you tell a story. You do not read slides. The slides support you. The slides are not the story. You take raw material from the slides and make it memorable; bring your story to life.



Maj. Raymond D. Lacourse
U.S. Air Force

The entire staff and faculty of the Defense Systems Management College were shocked and saddened by the sudden death of Air Force Maj. Raymond D. "Ray" Lacourse Dec. 9, 1998. Lacourse was a student in the Advanced Program Management Course (APMC) Class 98-3. In memory of Lacourse, his APMC Section D classmates planted a tree and placed a plaque and monument at the DSMC main campus, Fort Belvoir, Va.

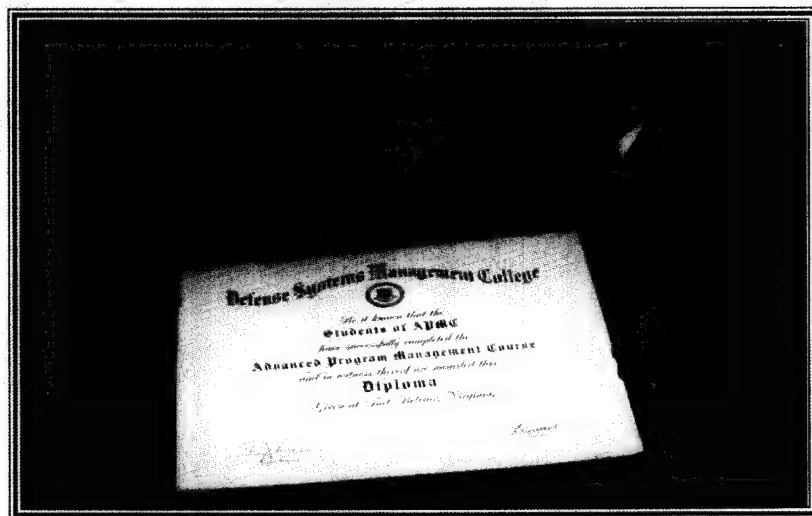
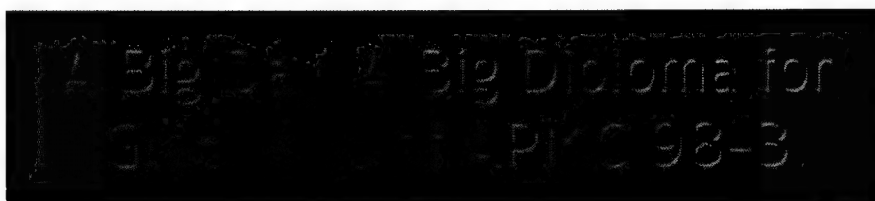
Many presenters read their slides because they did not prepare or rehearse the presentation. Their slides are their presentation. The results are unimpressive. When you present a fact, explain its importance; explain how it affects this audience.

Tip 8. Practice.

Practice the presentation with visuals and handouts before a live audience. Your team or support group will provide feedback on your presentation. Use their comments to strengthen the presentation.

Support groups prefer to give positive comments about presentations. If you ask each person for two strengths and two possible improvements, you will receive concrete examples to incorporate into the presentation.

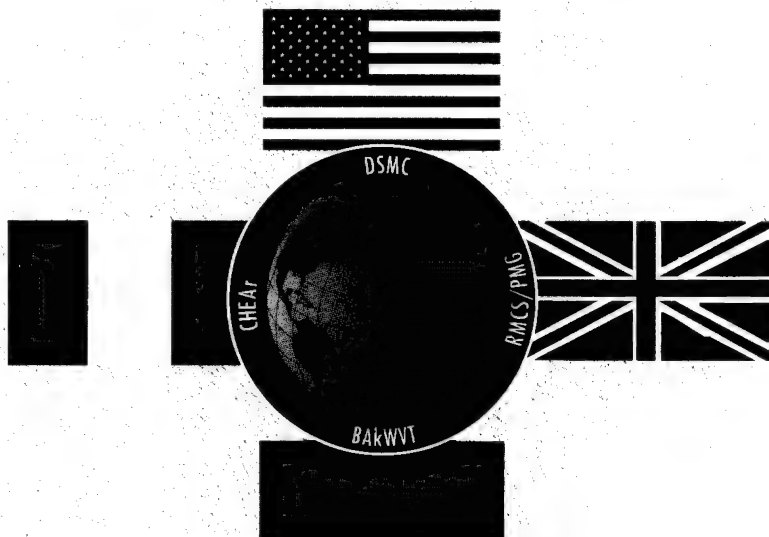
Eddie's presentation promoted audience confusion and apathy. The result was a disaster. If you apply the eight tips presented here, you will be the one remembered, and your position positively implemented.



Class President John C. Schaeffer, Jr. (center), accepts a large symbolic diploma on behalf of the 350 graduates of DSMC's Advanced Program Management Course (APMC 98-3). The class graduated Dec. 18, 1998, at Essayons Theater, Fort Belvoir, Va. The typical student of Class 98-3 was 41.5 years old, with 17.5 years of government service and 11 years of prior acquisition experience. On average, 71.2 percent of the students had a master's degree or higher. Pictured from left: Graduation keynote speaker, Air Force Lt. Gen. Frank B. Campbell, Joint Staff Director for Force Structure, Resources and Assessment; Schaeffer; Navy Rear Adm. Lenn Vincent, DSMC Commandant.

Photo by Richard Mattox

Eleventh Annual International Acquisition/Procurement Seminar — Atlantic



June 28 — July 2, 1999

Sponsored by the
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Defense Systems Management College (DSMC)
Fort Belvoir, Virginia

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This year's seminar will begin June 28 at the Defense Systems Management College (DSMC), Fort Belvoir, Va. The last day of the seminar, July 2, will be an optional day for those interested in the educational aspects of international acquisition.

The IDEA Seminar is by invitation only. Those desiring an invitation, who have not attended past IDEA Seminars, should submit a Letter of Request on government or business letterhead, to DSMC by fax. *Qualified participants pay no fee for the seminar.* Invitations, confirmations, and joining instructions will be issued after May 1.

For more information, visit the DSMC Web site at <http://www.dsmc.dsm.mil> on the Internet, or contact an IDEA Team member:

- Prof. Richard Kwatnoski, Director, International Acquisition Courses
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A New Acquisition Reform Culture For the Air Force

We Must Control Our Destiny And Our Spending Now Or Risk Having Someone Else Do It for Us

BRUCE D. WYMAN

For years, we've seen the competition for scarce resources — funding, personnel, and time — increase; it will continue to be intense in the years to come. We have more systems desired than affordable, a premium on skilled personnel, an increasingly dynamic business environment, and increased sensitivity to the efficiency and effectiveness of our use of resources.

Numerous blue ribbon/Office of the Secretary of Defense (OSD)/Services' studies and initiatives have identified not only acquisition system problem areas, but also opportunities for improving how we manage our limited resources.

Dr. Jacques S. Gansler, Under Secretary of Defense for Acquisition and Technology (USD[A&T]), commented on Sept. 2, 1998, that "The dilemma we face right now is in the budget area. We have unlimited demands for very limited resources.

"We simply can't afford to buy all the things we'd like to have, and if we continue on our present path we are not going to be able to afford to buy the things we have to have...If we don't begin to break out soon from this death spiral," he warned, "it will be impossible to do so later."¹

Among the potential actions Dr. Gansler must consider is "termination of a num-

ber of traditional weapon systems that are now in acquisition in order to fund the newer systems." He called widespread implementation of Acquisition Reform a necessary action. This directly reflects the fact that Air Force acquisition processes and the resources necessary to run them are not an end unto themselves, but rather, exist in order for the Air Force (and the other Services) to deliver required capabilities to the warfighters.

Off to a Good Start

The Air Force has successfully undertaken a number of aggressive efforts addressing specific areas of concern. Such efforts have already saved or resulted in cost avoidances of over \$20 billion for the Air Force in recent years. These efforts, however, were the easier achievements, compared to many of those that lie ahead.

Making future modifications and upgrades only on the margins of our acquisition system components — what some might call continuing to pick only the "low hanging fruit" — would not yield the substantial and ongoing savings necessary to offset increases in future resource demands for meeting the needs of the warfighters.

Using our past successes as a firm foundation, we must rethink the ways we accomplish acquisition and sustainment of systems across their entire life cycles.

Only by critically re-examining the core processes that we use for acquisition and sustainment activities — that is, taking a process-oriented approach — can we eliminate non-essential/non-value-added activities within our current acquisition practices, processes, and procedures, and ultimately institutionalize lasting and substantial improvements throughout our acquisition culture.

We have only one option: We must control our destiny and our spending *now*, or risk having someone else do it for us.

Rollout of a Concept

During Acquisition Reform Week III (AR Week III), May 4-8, 1998, the Air Force rolled out its next-generation Acquisition Reform concept — the Acquisition and Sustainment Reinvention Process. This next-level concept, using a process-oriented approach, leverages ideas for improvement in acquisition practices, processes, and procedures directly from the workforce and industry, and is designed to make Air Force acquisition better, faster, and cheaper.

Darleen Druyun, Principal Deputy Assistant Secretary of the Air Force for Acquisition and Management, announced and explained the new concept during a live satellite broadcast, featuring a panel discussion with Dr. Gansler, USD(A&T); along with Stan Z. Soloway, Deputy Under Secretary of Defense for Acquisition Reform

Wyman is a Senior Operations Research Analyst with ANSER, supporting the Acquisition Management Policy Division, Office of the Deputy Assistant Secretary of the Air Force for Management Policy and Program Integration. He holds an M.S. in Operations Research from the Naval Postgraduate School.

(DUSD[AR]); Air Force Gen. George T. Babbitt, Commander Air Force Materiel Command; and Air Force Lt. Gen. George K. Muellner, Principal Deputy Assistant Secretary of the Air Force for Acquisition.

At its core, the concept builds upon the substantial reforms already implemented or currently in progress, and incorporates continuous communication and feedback across four key phases:

- Identify
- Study and Develop
- Test
- Deploy

Added Assistant Secretary Drury, "We expect to achieve greater successes from every person, dollar, and hour we expend to acquire and sustain our current and new weapon systems."

To demonstrate their personal support of this new Acquisition Reform concept, senior Air Force acquisition leaders introduced this future for acquisition reform by traveling to each of the Air Force Product, Logistics, and Test Centers dur-

ing AR Week III and briefing the Acquisition and Sustainment Reinvention Process to the workforce.

Acquisition and Sustainment Reinvention Process

Phase 1 - Identify

The first phase of the Acquisition and Sustainment Reinvention Process — *Identify* — focuses on members of the acquisition workforce — including officers, enlisted, government civilians, and defense industry personnel — who are actively exploring and submitting ideas for consideration.²

Who are these thinkers and innovators? They're the front-line workers who are implementing today's new acquisition practices, processes and procedures; they're the "movers and shakers" who are seeking out broken or ailing process elements and developing new ideas, innovations, and fixes for outdated ways of doing business; and finally, they're the acquisition professionals who possess the hands-on knowledge and insights into ways in which we can work smarter, better, faster, and cheaper.

Phase 2 - Study & Develop

The second phase of the Acquisition and Sustainment Reinvention Process — *Study & Develop* — includes analyzing existing activities to better integrate related efforts and better understand the existing body of knowledge and initiatives. This phase also includes establishing a Reinvention Team to examine a particular opportunity that the Air Force Acquisition Reform Leadership Council approved for study.

AR Week III served to introduce the first set of initiatives to work through the new process. These initiatives all derived directly from longstanding problems identified from within the acquisition workforce. During AR Week III, senior acquisition leaders took these workforce ideas and developed them as themes for the first four Reinvention Teams:

- Evolutionary Acquisition
- Cost as an Independent Variable/Sustainment Emphasis in the Requirements Process
- Program Element Consolidation
- Contract Award Cycle Time.

An additional five Reinvention Teams have organized and begun their work. Three teams subsumed activities already in process and well along in the Study & Develop phase:

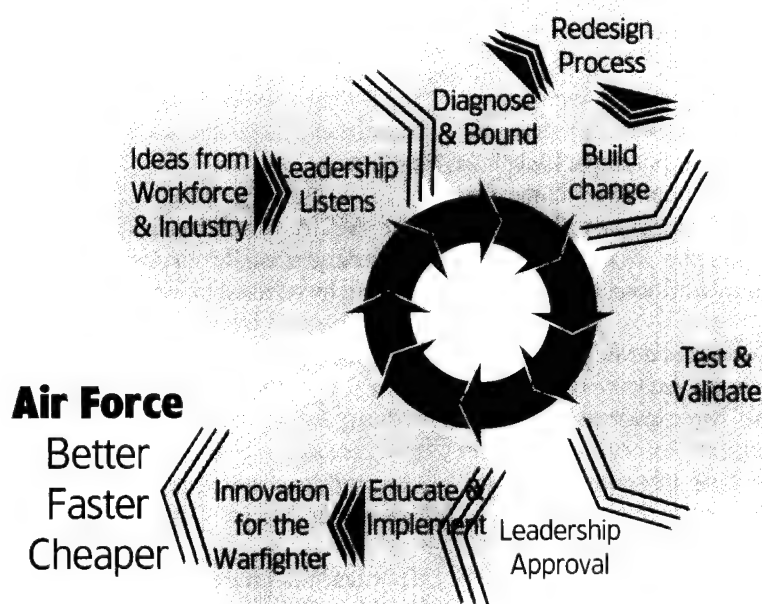
- Commercial Services (AFSCAG II)
- Reengineering the Source Selection Process
- Centralized Sustainment Contracts

The remaining two teams are:

- Acquisition Reform Training
- Total Ownership Cost

The Acquisition Reform Training Reinvention Team is addressing the adequacy, appropriateness, timeliness, and sufficiency of training required for meeting the needs of the acquisition workforce in an environment becoming ever more dynamic through Acquisition Reform.

The Total Ownership Cost Reinvention Team is concentrating on two aspects of the total ownership cost of weapon



Acquisition and Sustainment Reinvention Process

system modifications: how to fund the up-front support costs of modifications that have high, but longer, payoffs; and how to recapture resources saved in order to fund up-front support costs for similar modification efforts.

Many more Reinvention Teams will follow.

Each Reinvention Team, which includes members with a variety of different skills, experiences, and viewpoints, will first diagnose and set boundaries for their chartered problem, followed by a thorough examination and redesign of processes, as necessary. Finally, team members will build a proposed change package.

Called an "Innovation Package," each proposed change package will address achieving aggressive performance goals through design of processes ("process"); realignment of workforce rewards, incentives, and education ("people"); and proactive management of the change process itself ("change management").

Further, each Reinvention Team Leader has a great deal of latitude in identifying the scope of the Team's activity, the ways in which they identify and analyze the relevant processes involved, and the particular format and content of the final Innovation Package.

The challenge of being able to step back from our ingrained processes and procedures in order to conduct critical examinations is neither small nor easy. It requires careful identification and in-depth examination of:

- The core processes (vice functions) involved.
- Whom the processes are meant to serve.
- What products and services are provided.
- The inputs to the processes.
- The essential process elements that add value in the eyes of the process customers.
- The process elements that are necessary, although they don't add value in the eyes of the process customers.

- The waste elements that can be eliminated, because they are neither value-adding nor necessary.

It also requires the design of robust metrics that truly assess how well our core processes are achieving their intended results. Such processes typically cross both functional and geographic boundaries.

Phase 3 - Test

In the third phase of the Acquisition and Sustainment Reinvention Process — *Test* — each Innovation Package will be tested and validated in a limited, real-world environment to assess proof of the reinvention package design, design stability, further refinements needed, and leadership acceptance.

This is a critical phase of the process because it ensures that team members communicate and work out any difficulties in setup, interpretation, and interrelationships of the existing and proposed processes.

Also, by doing a limited-scope test and validation, we ensure that the final Innovation Package, when deployed, will be relevant, practical, and sustainable, and will not generate unexpected difficulties or cause misperceptions and erroneous expectations.

At the same time, we will test the metrics that we intend to use in judging the efficiency of the proposed package. If all looks well at this point, we will develop a detailed implementation plan and a communication plan for introduction to the acquisition workforce.

Following successful development of the plans, the entire package will be presented to Air Force leadership through the Acquisition Reform Leadership Council, for their subsequent approval and commitment to deployment.

Phase 4 - Deploy

In the final phase of the Acquisition and Sustainment Reinvention Process — *Deploy* — the Innovation Package will be implemented across the acquisition workforce, as appropriate, to deliver re-

quired capabilities to the warfighters. A key element of this phase is the education and training of the acquisition workforce to provide them the tools, knowledge, skills, and understanding necessary to implement change, where needed, quickly and effectively.

Another key element of deployment is establishing and assessing the resultant process performance through use of appropriate and adequate institutionalized metrics. This is the only way to judge the effectiveness of our reinvention efforts and assess the value of these activities.

Supporting Structure

Initially drafted by the Acquisition Management Policy Division (SAF/AQXA), Office of the Deputy Assistant Secretary of the Air Force for Management Policy and Program Integration, the Acquisition and Sustainment Reinvention Process was further reviewed by the Request For Proposal Support Office (RFPSO) representatives of the Product, Air Logistics, and Test Centers prior to the AR Week III rollout.

Subsequently, Major Command (MAJCOM) and Air Force Materiel Command Center commanders identified 20 senior "Acquisition Reform Champions" to assist Air Force leadership with coordinating, supporting, and encouraging Acquisition Reform efforts at their assigned organizations.

SAF/AQXA, as the focal point for Air Force Acquisition Reform activities, is augmented by selected individuals from the Secretariat and Headquarters staff, Reinvention Team Leaders, Acquisition Reform Champions, field representatives, Industry Associations, and functional and process experts from within the acquisition workforce and industry, to form the Acquisition Reform Core Team.

This team is charged with reviewing Acquisition Reinvention Idea submissions; integrating related ongoing ideas, ongoing reforms, and reporting requirements; proposing Reinvention Team themes; preparing work packages

and guidance for Reinvention Teams; supporting the Reinvention Teams and team leaders; making recommendations for awards and recognition; and supporting the Acquisition Reform Leadership Council.

The Acquisition Reform Leadership Council is a select group of Deputy Assistant Secretary-level, Secretariat, Headquarters, Air Force Materiel Command, selected product and logistics centers, MAJCOM, OSD senior leadership, and Industry Association professionals. Charged with approving Reinvention Team themes and the resultant deployment packages, they also provide guidance and policy for Acquisition Reform activities, provide "top cover" for ongoing Acquisition Reform initiatives and studies, provide advocacy for Acquisition Reform, and bring an industry perspective to Acquisition Reform activities.

Reinvention Team Operations

Each Reinvention Team (RT) Leader, nominated by a designated command, is personally approved and designated by Assistant Secretary Druyun. The RT Leader then receives a Reinvention Package prepared by the Core Team, which provides a Prologue describing the RT objective, the contextual framework, and a proposed scope.

Additionally, the Reinvention Package includes information on a number of the factors that the RT needs to consider within the areas of Process, People, Performance, and Change Management, as the team develops its Innovation Package product. The Reinvention Package also includes the Rules of Engagement for the RT, along with relevant background briefings and information on other related ongoing reform activities.

The RT Leader is responsible for developing the team membership based upon the required skills, knowledge, and experience needed for the team to accomplish its tasking. Further, the RT Leader is responsible for team activities, team schedule, individual levels of commitment, and the final Innovation Package.

To provide a bias toward accomplishment, each RT is expected to accomplish its tasking within a maximum of nine months. Approximately four weeks after an RT Leader establishes his or her team, the RT Leader must personally present a baseline briefing to SAF/AQ, including an outline of the RT's scope, the approach that the team intends to use, and the proposed timeline of activities. The outcome of this briefing is a personal contract between the RT Leader and SAF/AQ.

RT Leaders have significant flexibility in identifying the skills and talents of the individuals that they bring onto their team's membership, whether they be on a full-time or part-time consulting basis. They also have free rein in developing an Innovation Package with a mix of both "inside the box" and "outside the box" solution elements.

As each RT is established, a dedicated Web site for RT members will be established on the Air Force Acquisition Home Page to facilitate the cross-flow of information between geographically separated team members. This action should reduce the need for all team members to be in the same place at the same time for all meetings and discussions.

An additional benefit of the Web site will be improved cross-flow of information between the various RTs, so that each can benefit from insights gained and lessons learned by other teams. Ideally, a Web site accessible to the general public will allow members of the acquisition workforce to find out the latest news and activities for each of the Acquisition Reform initiatives discussed in this article, and may ultimately spark submission of additional related ideas.

The Challenge Train

This is an exciting time for Air Force acquisition, and there is a groundswell of participation in these acquisition and sustainment reform activities. Although many members of the Air Force acquisition workforce were introduced to this new reform concept during AR Week III, many more have yet to experience this new concept of changing the Air Force

acquisition and sustainment culture and future environment.

Toward that end, three meetings with industry representatives have already taken place, and more around the nation will follow. But a key point in this entire acquisition and sustainment reinvention culture is that acquisition and sustainment reinvention is the job of *everyone* in the Air Force acquisition workforce, including industry: *Acquisition and sustainment reinvention belongs to everybody, and will not work without you and your personal involvement.*

It is essential — throughout all the scrutiny and evaluation of DoD's current business practices, and as we review the palette of alternative opportunities available — that we remain focused on the end goal: making Air Force acquisition and sustainment function better, faster, and cheaper so that we can deliver required capability to the warfighters where they need it, when they need it.

The challenge train is already headed out of the station and this bullet train is building speed rapidly. We invite you to *climb aboard*, and be a part of this reinvention culture now!

E N D N O T E S

1. Dr. Jacques S. Gansler, USD(A&T), Speech to the Association of the U.S. Army, "The Revolution in Business Affairs — The Need to Act Now" (Falls Church, Va., Sept. 2, 1998).

2. The Air Force has established multiple ways, both overt and anonymous, for members of the acquisition workforce to submit problems and ideas for consideration: <http://www.safaq.hq.af.mil/innovation> (anonymous if desired); E-mail arideas@af.pentagon.mil (source not revealed except by permission of submitter); and telephone Commercial (703) 588-7100 or DSN 425-7100.

Since the inception of these avenues of communication in May 1998, the Air Force has received 68 ideas.

Agile Support Project — Global Hawk Program

Rapid Supply, Responsive Logistics Support for Next-Generation UAVs

MARY ANN BARRACO KLEMENT

The Global Hawk Unmanned Aerial Vehicle (UAV) program is a high-altitude, long-endurance unmanned aerial reconnaissance system designed to provide military field commanders with high-resolution, near real-time imagery of large geographic areas. Designated as an Advanced Concept Technology Demonstration (ACTD) program, Global Hawk is funded by the Defense Airborne Reconnaissance Office (DARO) and managed by the Defense Advanced Research Projects Agency (DARPA).

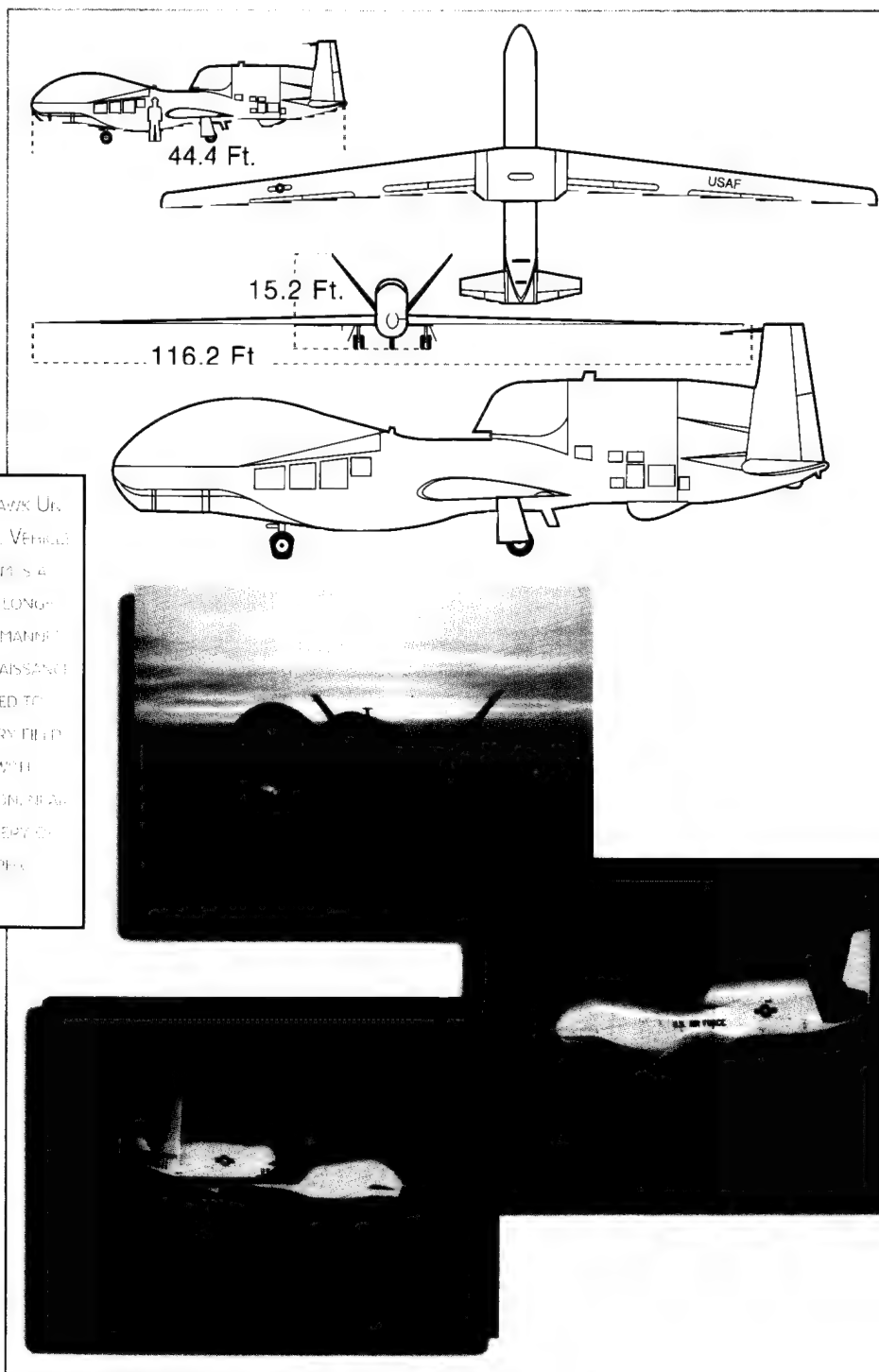
The 14,000-nautical-mile range and 42-hour endurance of the air vehicle, combined with satellite and line-of-site communication links to the ground segment, will permit worldwide operation of the system. High-resolution sensors, which can look through adverse weather day or night from an altitude of 65,000 feet, will conduct surveillance over an area the size of Illinois in just 24 hours..

THE GLOBAL HAWK UNMANNED AERIAL VEHICLE (UAV) PROGRAM IS A HIGH-ALTITUDE, LONG-ENDURANCE UNMANNED AERIAL RECONNAISSANCE SYSTEM DESIGNED TO PROVIDE MILITARY FIELD COMMANDERS WITH HIGH-RESOLUTION, NEAR-REAL-TIME IMAGERY OF LARGE GEOGRAPHIC AREAS.

Affordable Logistics Support

ACTD programs such as Global Hawk typically include the delivery of a limited quantity of prototype units for eval-

Klement is an Engineering Director at GDE Systems in San Diego, Calif. Currently she is managing a new technology program in support of the latest reconnaissance plane (Global Hawk). She is the author of five technical papers on the applications of logistics technology and has produced six films on this subject. She holds a bachelor's and master's in Physics as well as a master's in Engineering Management.



uation and potential operational use. One problem this poses is the difficulty of providing affordable logistics support for the user when there is little economy of scale, and of meeting readiness and sustainability when a part fails and a spare is not immediately available.

Due to the lack of a formal logistics support system consisting of trained maintenance specialists, technical manuals, and a large inventory of spare parts, the user must rely on the contractor for supplementary troubleshooting assistance and for rapid resupply of spares.

Agile support concepts offer a solution to this problem by demonstrating innovative ways to provide affordable logistics support to an ACTD program. These include the development of a real-time maintenance network, rapid resupply of key suppliers using commercial business techniques and strategic business relationships, and reduced inventories of spare parts.

The application of Agile support concepts to the Global Hawk program results in a \$22-million decrease to the overall life-cycle cost of the program, while contributing to a 20-percent increase in operational availability.

Agile Support Program in Brief

The Agile Support Integrated Product Team (IPT) led by GDE Systems, consists of team members from Teledyne Ryan, Raytheon Systems Company, L-3 Comm, and TASC. Together, our team is developing an 18-month, two-part Agile Support program consisting of a simulation and analysis effort and a demonstration effort. During the simulation and analysis phase, we will investigate and assess supportability enhancing techniques. Our investigation and assessment will then be followed by the demonstration phase, where we will demonstrate Agile technologies to improve the supportability of the Global Hawk system.

Our program is being conducted concurrently with Phase II of the Global Hawk Design program. Developed by our IPT, the implementation plan pro-

vides a limited inventory of spares to augment the current inventory early in the flight test program. This leaves in place a cooperative business organization with a secure telecommunications network that provides connectivity between Teledyne Ryan, the flight test site at Edwards AFB, and major suppliers for rapid resolution of support problems (Figure 1).

Elements of Agility

The Agile support program consists of the following key elements:

- A telemaintenance system that has been put in place to link up the operational and flight test bases with the Teledyne Ryan Action Center and its key suppliers.
- An automated fault diagnostics capability used for troubleshooting, consisting of expert systems and integrated database and digital images of the problem areas.
- Supplier strategic partnering consisting of electronic web-based procurement of spares and supplier agreements for rapid spares delivery.

Our team evaluates all of these elements for cost and mission availability benefits using our discrete event simulation model customized for Global Hawk and the government-provided Cost Analysis Strategy Assessment (CASA) Life Cycle Cost Model.

Under telemaintenance, we have established an Action Center at Teledyne Ryan Aeronautical (TRA) that uses data results from the automated fault diagnostics process, assessment tools to provide logistics and operations options and strategies, and experts to initiate and coordinate solutions to complex maintenance and logistics problems.

To expedite the solutions to hardware and software maintenance problems, we have installed a communications network that connects the TRA Action Center, the maintenance repair site, and product experts not located at TRA. To further enhance the process, we use a digital camera at the flight test site to transmit real-time images to clarify or

FIGURE 1 Agile Support to the Global Hawk Program

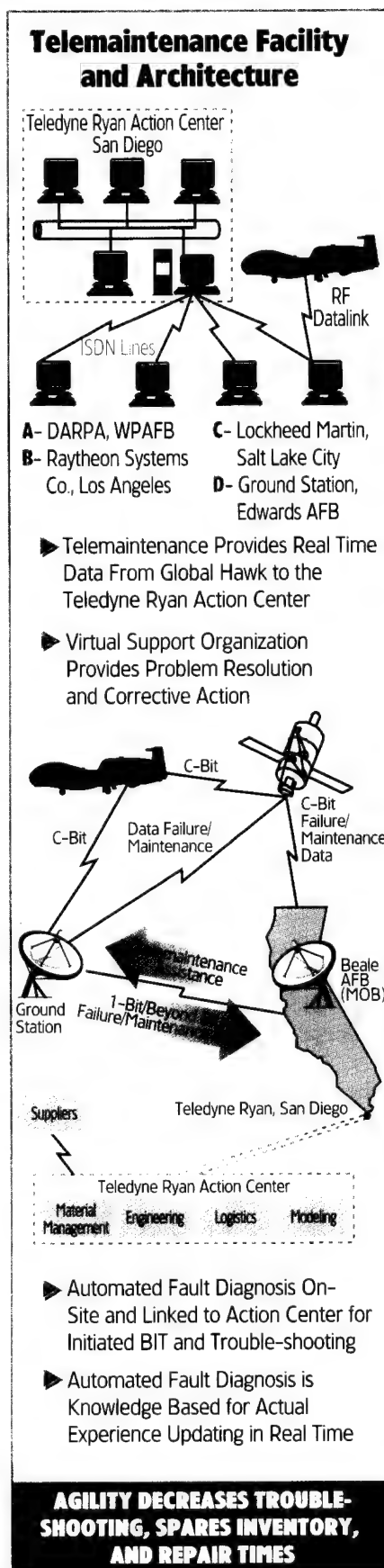
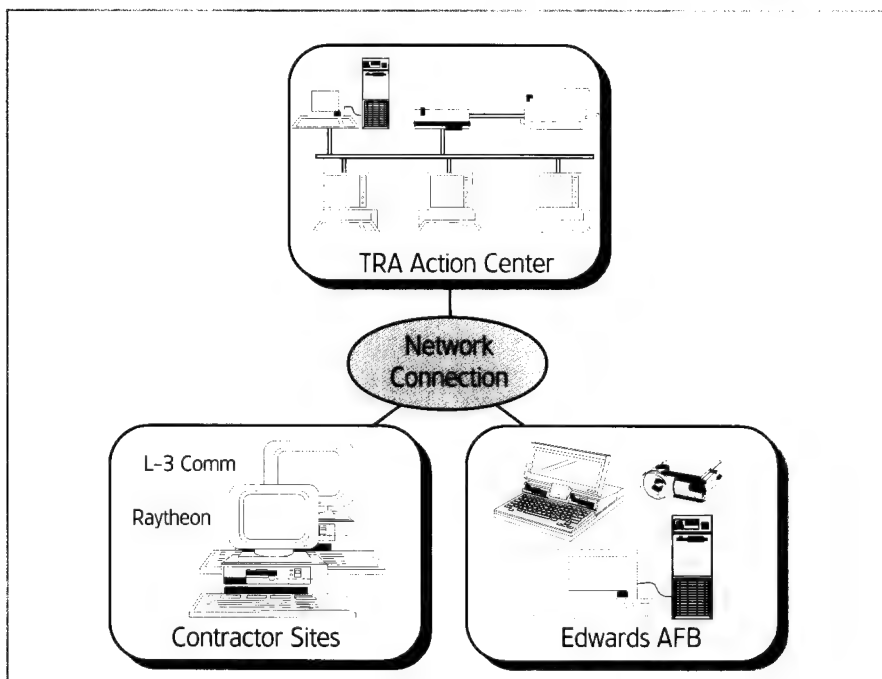


FIGURE 2. Agile Logistics Hardware and Network Configuration



amplify a specific condition. Figure 2 shows the Agile Logistics hardware and network configuration.

AUTOMATED FAULT DIAGNOSTICS CAPABILITY

The Agile program uses the results of the failure modes and effects analysis previously conducted on selected air vehicle systems (and the associated functional block diagrams, failure, test and monitor logic generated on the Global Hawk program) to create an integrated database. An Automated Fault Diagnostics (AFD) process is developed that takes the established logic and uses failure and status indicators (i.e., Symptoms List) for input to perform fault isolation and detection.

The results (i.e., failure causes) are then put before the experts (technical support) for validation. This forms the basis for an evolving AFD expert system hosted on a PC that organizes symptoms, failures, and test and repair procedures in a logical structure.

Now that Global Hawk flight-testing has commenced, the air vehicle fault log data are being downloaded from the Vehicle Test Controller (VTC) after every flight.

For diagnostic capability, a fault log is read from the UAV after it is on the ground through a portable maintenance computer with a 1553 bus connection. This log is then downloaded through the server at Edwards to the Action Center at Teledyne Ryan where automated diagnostic software, expert systems, and fault recording determine what is wrong and how to fix it.

Relevant maintenance instructions are accessed remotely while a spare is requested electronically. This allows the UAV to transmit failure data and symptoms in real time and update the Action Center electronically. As the UAV transitions to production, these data could be used to provide designers with a baseline for design changes or to begin the design at a future date after the ACTD program has stopped and the UAV technology has been proven.

SPARES-ON-DEMAND

Global Hawk is demonstrating Spares-On-Demand by procuring Line Replacement Units (LRU)/subsystems critical to the success of the flight test program using virtual organization business arrangements, rapid response provisioning, and strategic partnering.

LRUs/subsystems/piece parts are selected for procurement from the list of candidate flight and mission-critical parts. Basic Ordering Agreements (BOA) are made with suppliers of the selected repair parts defining cost, lead time, and supplier support relationships that will enable rapid response to requisitions for the repair parts. The suppliers are connected to the telemaintenance network to form a virtual business organization that can react rapidly to procurement decisions.

With the BOAs in place, a Procurement Action Review (PAR) is conducted with DARPA and a decision made to initiate procurement of the selected repair parts. When the procured parts are delivered, the costs and delivery lead times of the Agile procurement effort are compared with a standard procurement process to determine the relative benefits of each. In order to implement spares-on-demand, we incorporated the following Agile techniques:

- Strategic Partnering
- Multi-tier Purchasing Agreements
- Vendor Certifications
- Delivery to Point of Use
- Vendor Base Consolidations
- Networked Information Systems and Resource Planning
- Rapid Supply Chain Contracting
- Electronic Data Interchanges

These techniques form the basis for a rapid resupply network of spares, which enhances the overall readiness of the Global Hawk system while reducing the logistics support costs. A brief description of each follows:

STRATEGIC PARTNERING

The suppliers chosen for the Global Hawk Program were, in many instances, unaware of Agile support techniques to improve procurement and contracting lead times. As a result of investigating ways to increase efficiencies and develop more interest in electronic ordering via the Internet, suppliers to TRA have positioned themselves as strategic partners for future TRA projects. Raytheon Systems Company and L-3 have adopted Agile support techniques to provide

spares and repairs on a more timely basis. Several representative examples of these Agile support techniques from our vendors are worthy of mention.

L-3 Communications. To expedite spares orders, L-3 has implemented electronic ordering, multi-tier purchasing agreements to reduce cost and schedules, strategic partnering, vendor certifications to eliminate process times, and direct deliveries of repaired LRUs to Edwards AFB.

Raytheon Systems Company

By using the agility method of stocking critical parts, Raytheon has placed four of the Integrated Sensor Suite (ISS) Synthetic Aperture Radar (SAR) transmitter parts at their vendor's facility to expedite transmitter repair. This method of procurement will reduce cost and shorten repair lead time.

The delivery lead-time of a spare transmitter to Raytheon from their vendor is approximately 24 weeks. The longest lead time associated with the four critical parts is 20 weeks. This reduces the lead-time by four weeks. The cost savings by using this method is approximately \$30,000, the difference between

buying and stocking a spare transmitter or buying and stocking the four critical parts. The 12 weeks needed to build the traveling wave tube (TWT) at the supplier's facility in Los Angeles will also be reduced to 10 weeks by expediting the procurement process.

Mercury Computer Systems Inc., and the Mercury Processor Card

Mercury Computer Systems Inc., has offered an Air Spare Maintenance Agreement that commits to an overnight delivery of a spare Mercury Processor Card to any repair site within the continental United States.

From an Agile support techniques standpoint, Mercury will have a spare card available on their shelf for immediate shipment when required. This negates the need to purchase spare Mercury Processor Cards and substantially reduces support costs.

Raytheon and the Processor Control Unit Cards

Raytheon has purchased a jumbo repair kit for the Processor Control Unit Cards. This kit will be used to repair both units, which are part of the receiver/exciter in the Integrated Sensor Suite Synthetic

Aperture Radar. This provides a substantial cost savings over purchasing each unit as a spare. By having this kit on hand at the vendor facility, the repair turnaround time will be reduced to one week.

MULTI-TIER PURCHASING AGREEMENTS

To ensure that repairs will be processed on an Agile basis, TRA will have Raytheon store, manage, and control all Raytheon-supplied Agile spares. This function also includes the management of repairs directly with their vendors. To accomplish this, Raytheon will contract directly with Mercury Computer Systems Inc., for the repair of the processor cards and their transmitter vendor for transmitter repairs.

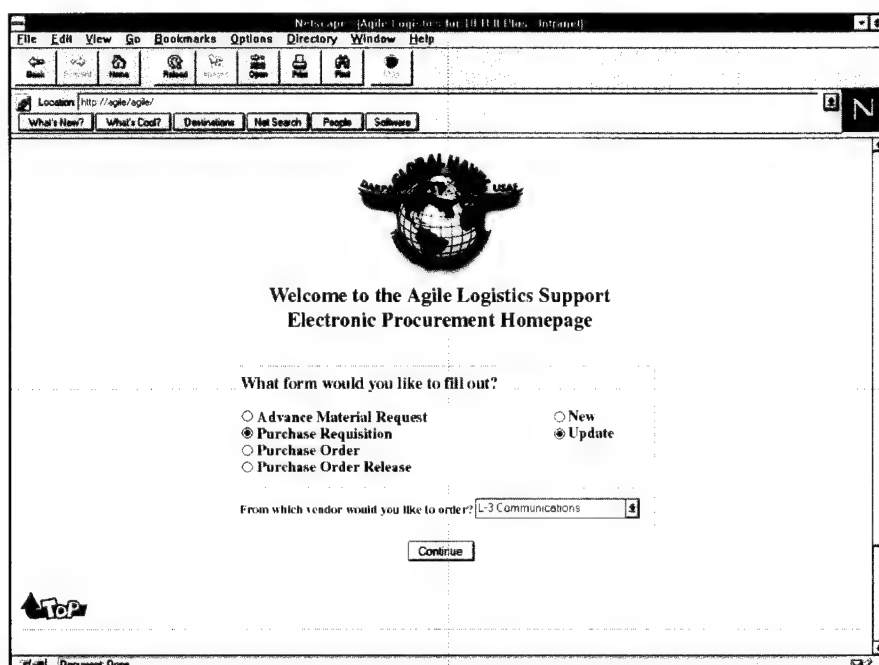
These multi-tier repair arrangements will eliminate many hours of paperwork processing by the contracting departments for each required repair. During the next phase of the Agile Support Project, our team will analyze and verify the time-savings. This method of having a major supplier responsible for the total management of spares distribution, repair, storage, quality assurance, and shipping will demonstrate the Agile support technique of multi-tier purchasing agreements.

VENDOR CERTIFICATIONS

As a standard practice, TRA has implemented a Supplier Product Excellence Program (SPEP). This program certifies selected suppliers for quality in manufacturing and administration and for consistent delivery of quality parts and hardware. SPEP suppliers must follow stringent quality guidelines that include on-site surveys, timely deliveries, and implementation of Statistical Process Control (SPC) with adherence to the SPEP guidelines. This has not been easily achieved for most SPEP candidates. To date, 15 suppliers have completed certification.

Unfortunately, none of the 15 suppliers is currently providing Agile spares. However, the Agile support project is constantly monitoring the SPEP program for additional certified suppliers. Once

FIGURE 3. Agile Logistics Support Electronic Procurement Home Page



an Agile supplier is certified, the process for purchasing parts will become extremely abbreviated due to the fact that source and receiving inspections will no longer be required and the supplier will be used more frequently with minimal paperwork.

DELIVERY TO POINT OF USE

Spares purchased under the Agile contract to support Global Hawk flight testing will be stored at TRA and subsequently shipped directly to Edwards AFB, with the exception of Raytheon spares. These parts will be stocked at Raytheon for accomplishing LRU repairs.

TRA is making every effort to create an Agile environment during the repair process. One very effective method to achieve agility is to have Raytheon drop-ship repaired parts directly into Edwards AFB in lieu of shipping to TRA. This delivery-to-point-of-use method will save countless transportation and administrative hours.

VENDOR BASE CONSOLIDATIONS

This Agile support technique would be very effective on contracts that contain hundreds of suppliers. To streamline the acquisition process on a large program, a supplier analysis and assessment would have to be initiated to determine where vendor base consolidation would be practical. On this particular program, spares were purchased to demonstrate agility from seven very specialized suppliers.

Consolidation would have been extremely impractical for a program this small. However, to avoid some of the initial confusion and the issues encountered with changing procurement processes with seven suppliers, consolidation to one supplier would have made the change process less stressful and certainly more agile.

NETWORKED INFORMATION SYSTEMS AND RESOURCE PLANNING

As part of this contract a telemaintenance network was established between the TRA Action Center, Raytheon, L-3, and Edwards AFB to provide database information to all Agile team members, as

well as to provide solutions to hardware and software maintenance problems that will arise during the flight test program.

During the next phase of the Agile support project, the telemaintenance network will be used extensively to check the status of additional spares ordering, to monitor delivery dates, and to determine spares/repairs locations.

RAPID SUPPLY CHAIN CONTRACTING

On this contract, TRA and its suppliers of Agile spares have demonstrated rapid supply chain contracting. All contractual arrangements, terms, and conditions had to be made in advance of placing orders to minimize a very lengthy pre-contracting process. We anticipate that agreements established during this phase of the Agile contract will demonstrate timely and cost-effective techniques during the next program phase.

ELECTRONIC DATA INTERCHANGES

Electronic data interchange development was the most significant Agile support technique contribution on this project. The electronic interchanges were concentrated mainly on spares ordering using the Internet and disseminating all program information to the Agile team via the telemaintenance network and database developments.

The electronic Purchase Request (PR) and Purchase Order (PO) forms were designed to duplicate the paper forms that exist at TRA. The intent is to provide electronically all information required by Purchasing to order components, without disrupting the process already in place at TRA. Most importantly, supplier relationships have to be undisturbed.

The process started with gathering information contained on existing paper PRs and POs and determining what fields would require coding to maintain the integrity of the new electronic order process. Upon completion of the process review, our team developed and implemented Web-based PR/PO forms. In designing the forms we defaulted or pre-filled electronically, information applic-

able to all PRs/POs. Our strategy was twofold: to provide as much agility as possible and to minimize the number of errors introduced into the purchasing system.

Figure 3 shows the Agile Logistics Support Electronic Procurement Home Page, which is used internally on the TRA Intranet. Several options are available at this site, including developing a Purchase Request or Purchase Order online. Vendor data are automatically inserted as different vendors are selected. When the Purchase Order form is ready and authorized by procurement, vendor contracting officers selected receive an E-mail message automatically providing them with an address on the Internet to view the PO and informing them that a purchase has been placed.

We've Come a Long Way

The Agile support to the Global Hawk program is an 18-month contract to implement Agile support techniques in support of the first two Global Hawk High Altitude Endurance UAVs.

To recap our accomplishments, the Agile Support IPT has established a telemaintenance network with an Action Center at TRA and connections to Raytheon Systems Company in Los Angeles, Calif. (the payload supplier); L-3 Communications in Salt Lake City, Utah (the communications system supplier); and the flight test and maintenance center at Edwards AFB, Calif.

In addition, our team has put in place supplier relationships and commercial shipping practices to ensure rapid delivery of spares.

The Agile support project is a revolutionary implementation of rapid supply and responsive logistics support for the next generation of UAVs that will, ultimately, be used for worldwide reconnaissance.

Editor's Note: The author welcomes comments or questions concerning Agile Support to the Global Hawk Program. Contact her at mklement@gdesystems.com on the Internet.



ACQUISITION REFORM

An Internet Listing Tailored to the Professional Acquisition Workforce

Surfing the

et

<http://www.acq.osd.mil>

ACQWeb offers the Defense Federal Acquisition Regulation Supplement online, a library of USD documents, and jump points to many other valuable sites.

<http://www.acq.osd.mil/ar>

Hot topics in AR; reference library; *AR Today* and *AR Now*; DUSD(AR) organizational breakout; "Ask a Professor" assistance

<http://www.acq.osd.mil/aprism/>

Documentation, including Department of Defense Directives 5000.1 and 5000.2-R, Major Defense Acquisition Programs List, and more.

<http://www.acq.osd.mil/te/programs/se>

Systems engineering mission; Defense Acquisition Workforce Improvement Act information, training, and related sites; information on key areas of systems engineering responsibility.

<http://www.deskbook.osd.mil>

Automated acquisition reference tool covering mandatory and discretionary practices as well as procurement wisdom.

<http://www.acq.osd.mil/dau>

DAU course and schedule information; consortium school links; acquisition documents and publications. ARCC provides Acquisition Reform training information, including satellite broadcast information!

<http://www.dacm.sarda.army.mil>

News; policy; publications; contacts; training opportunities.

<http://www.acqnet.sarda.army.mil>

Documents library; training and business opportunities; past performance; paperless contracting; labor rates.

Re

<http://www.acq-ref.navy.mil/>

Information on Industrial Base Integration, World-Class Practices, the Acquisition Center of Excellence, and training opportunities.

Re

<http://nardic.nrl.navy.mil>

News; announcements; acronyms; publications and regulations; technical reports; "How to Do Business With the Navy."

Re

<http://www.navsea.navy.mil/sea017/toc.htm>

Total Ownership Cost (TOC); Background and Documentation; Reduction Plan; Implementation Timeline; Process; TOC reporting templates.

Re

<http://www.safaq.hq.af.mil/>

Reducing TOC; career development and training opportunities; library; links.

Re

<http://farsite.hill.af.mil/>

FAR search tool; *Commerce Business Daily* Announcements (CBDNet); *Federal Register*; Electronic Forms Library.

Re

<http://www.acclg.af.mil/lgc/lgc.htm>

Business opportunities; acquisition regulations; policy guidance and technical assistance in areas such as: performance measurement; International Merchant Purchase Authorization Card (IMPAC); commercial practices; outsourcing and more.

Re

<http://www.crfpst.wpafb.af.mil/>

Federal Register and Waivers Package; documents and briefings; reference material; Frequently Asked Questions (FAQ); links to related sites.

Re

<http://www.arpa.mil>

News releases; current solicitations; "Doing Business with DARPA."

Development

<http://www.disa.mil>

Structure and mission of DISA. Defense Information System Network; Defense Message System; much more!

<http://www.dsmc.dsm.mil>

DSMC educational products and services; course schedules; *Program Manager* magazine and *Acquisition Review Quarterly* journal; job opportunities.

<http://www.nima.mil>

Geospatial and imagery information; publications; business opportunities.

<http://www.dmsi.mil>

DoD Modeling and Simulation Master Plan; services; resources; activities.

<http://www.dtic.mil/>

Scientific and technical reports; products and services; registration with DTIC; special programs; much more!

<http://www.acq.osd.mil/ec/>

Policy; newsletters; Central Contractor Registration; Value Added Networks; assistance centers; Electronic Commerce/Electronic Data Interchange (EC/EDI) Handbook; EC training.

<http://www.acq.osd.mil/osjtf>

Open Systems education and training opportunities; studies and assessments; projects, initiatives and plans; reference library.

<http://www.afit.af.mil/Schools/DU/schedule.htm>

Schedule of distance learning opportunities.

<http://www.jads.abq.com>

JADS is a one-stop shop for complete information on distributed simulation and its applicability to test and evaluation and acquisition.



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<http://www.gidep.corona.navy.mil>
Federally funded co-op of government and industry participants that provides an electronic forum to exchange technical information essential during research, design, development, production and operational phases of the life cycle of systems, facilities, and equipment.

<http://www.arnet.gov>
Virtual library; federal acquisition and procurement opportunities; best practices; electronic forums; business opportunities.

<http://www.faionline.com>
Virtual campus for learning opportunities as well as information access and performance support.

<http://nais.nasa.gov/fedproc/home.html>
Procurement and acquisition servers by contracting activity; CBDNet; Reference Library.

<http://www.asu.faa.gov>
Access to GAO reports, policy and guidance, and FAQs.

<http://www.gao.gov>
Access to GAO reports, policy and guidance, and FAQs.

<http://www.gsa.gov>
Online shopping for commercial items to support government interests.

<http://www.loc.gov>
Public laws; legislation; vetoed bills; Congressional Internet services.

<http://www.npr.gov/>
NPR initiatives; "how to" tools; customer service; newsroom; online resources; accomplishments and awards.

Technical Information Service (NTIS)
<http://chaos.fedworld.gov/ordernow/>
Online service for purchasing technical reports, computer products, videotapes, audiocassettes, and more!

Business Administration (SBA)
<http://www.SBAonline.SBA.gov>
Communications network for small businesses.

Coast Guard
<http://www.uscg.mil>
News and current events; services; points of contact.

Industry and Professional Organizations
Commerce Business Daily
<http://www.govcon.com/>
Access to current and back issues with search capabilities; business opportunities; interactive yellow pages.

Electronic Industries Association (EIA)
<http://www.eia.org>
Government Relations Department includes links to issue councils.

Contract Management Association
<http://www.ncmahq.org>
"What's New in Contracting?"; educational products catalog.

Defense Industries Association
<http://www.ndia.org>
Association news; events; government policy; *National Defense* magazine.

National Society of Logistics Engineers
<http://www.sole.org/>
Online desk references that link to logistics problem-solving advice.

Computer Assisted Technology Transfer Program
<http://catt.bus.okstate.edu>
Collaborative effort between government, industry, and academia. Learn about CATT and how to participate.

DoD
<http://www.dsp.dla.mil>
All about DoD standardization; key POCs; FAQs; MilSpec Reform; newsletters; training; non-government standards; links to related sites.

DoD
<http://www.acq.osd.mil/pm/>
Implementation of Earned Value Management; latest policy changes; standards; international developments; active notebook.

FedWorld
<http://www.fedworld.gov>
Comprehensive central access point for searching, locating, ordering, and acquiring government and business information.

GSA
<http://www.fss.gsa.gov>
Go to "GSA Advantage" for assistance in using the government-wide IMPAC Card.



If you would like to add your Web site to this list, please call the Acquisition Reform Communications Center (ARCC) at 1-888-747-ARCC. DAU encourages the reciprocal linking of its Home Page to other interested agencies. Contact the DAU Webmaster at:
dau_webmaster@acq.osd.mil



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<http://www.acq.osd.mil/api/asm/>

Documentation, including Department of Defense Directives 5000.1 and 5000.2-R, Major Defense Acquisition Programs List, and more.

<http://www.acq.osd.mil/te/programs/se>

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Acquisition, Rese iation Center

<http://nrdic.nrl.navy.mil>
News; announcements; acronyms; publications and regulations; technical reports; "How to Do Business With the Navy."

Sea Systems Co

<http://www.navsea.navy.mil/sea017/toc.htm>
Total Ownership Cost (TOC); Background and Documentation; Reduction Plan; Implementation Timeline; Process; TOC reporting templates.

rce (Acquisition)

<http://www.safaq.hq.af.mil/>
Reducing TOC; career development and training opportunities; library; links.

Force Materiel Con (AFMC)

<http://farsite.hill.af.mil/>

FAR search tool; *Commerce Business Daily* Announcements (CBNet); *Federal Register*; Electronic Forms Library.

Quarters, Air Command (HQ)

<http://www.acclg.af.mil/lgc/lgc.htm>
Business opportunities; acquisition regulations; policy guidance and technical assistance in areas such as: performance measurement, International Merchant Purchase Authorization Card (IMPAC); commercial practices; outsourcing and more.

Acquisition Workforce Personnel Demonstration Project

<http://www.crfpst.wpafb.af.mil/>
Federal Register and Waivers Package; documents and briefings; reference material; Frequently Asked Questions (FAQ); links to related sites.

Defense Advanced Research Projects Agency (DARPA)

<http://www.arpa.mil>
News releases; current solicitations; "Doing Business with DARPA."

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<http://www.disa.mil>
Structure and mission of DISA; Defense Information System Network; Defense Message System; much more!

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Open Systems Joint Task Force

<http://www.acq.osd.mil/osjtf>
Open Systems education and training opportunities; studies and assessments; projects, initiatives and plans; reference library.

Government Education and Training Network (GETN) (For Department of Defense Only)

<http://www.afit.af.mil/Schools/DL/schedule.htm>
Schedule of distance learning opportunities.

Joint Advanced Distributed Simulation (JADS) Joint Test Force

<http://www.jads.abq.com>
JADS is a one-stop shop for complete information on distributed simulation and its applicability to test and evaluation and acquisition.

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